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The Thirty-Second Milestone

THE INDIA RUBBER WORLD'S time record figured in decades runs thus: 1889, 1899, 1909, 1919 + 2. *In other words,* 32 *years. A long time as trade papers go. And a bit unusual that one management should persist and the same editor face the* 33*rd year with fresh interest and the desire for broader vision and increased usefulness. To our many readers and friends the world over, we extend greetings and confidently promise future issues equal to our best and possibly better in the light of present planning.*

TEXTS FOR RUBBER PUBLICITY

ARGUMENTS are plentiful, appealing and convincing for a world-wide campaign of publicity for furthering the interests of the rubber industry. It has been held, and with good reason, that the rubber trade has quite as much to gain from such an educational enterprise as was secured by the rice, coffee, citrus, walnut, raisin, cement, brick, paint, lumber, laundry, wall paper, and other interests that have taught the people to better appreciate and more extensively purchase their products. Why should rubber be "the Cinderella of civilization," as Grant Allen puts it, "lurking in the back kitchen of invention, never in evidence, but doing most of the hard work just the same?" The Rubber Association of America has advocated propaganda that should redound greatly to the advantage of every planter, dealer, and manufacturer if projected on a broad and comprehensive scale. The story of rubber, than which there is in all industry none more romantic in inception or more engrossing in diverse development, should be engagingly told and retold. The greater potentialities of rubber products should be thoroughly emphasized.

While the campaign would be designed primarily for the benefit of the rubber trade, it would also be decidedly advantageous to the general public. It could, for instance, show why for health, comfort and economy a rubber sole should be on every shoe; it could point out the folly of buying so-called bargain tires; it should indicate how the buyer of raincoats at "foreclosure" and like sales almost always loses; it should depict the danger of purchasing poor grades of druggists' sundries, especially hot water bottles, citing cases in which patients were even scalded and hospitals sued; and it can point out the fact that manufacturers who turn out the best goods always put their names and brands upon them.

AN AUTOMOTIVE AND ACCESSORY CREED

UNDER the title, "Fair Trade Practices," the Automotive Equipment Association formulates a creed of 31 articles that is excellent, and if adhered to will be a great aid to commercial morality.

In no uncertain terms common evils are condemned, such as piracy, rebates, post dating, return without consent, cancellation, threatening, cut prices without offer to manufacturer, unreasonable guarantees, ordering by telephone, syndicate buying, wandering commission salesmen, bonuses to employes or others, raffles, souvenirs and house organ advertisements, and various faults of less moment.

The articles favor arbitration, cooperation in credit information, interest on overdue accounts, strict adherence to contracts, trade acceptances, 2 per cent discount for cash, 10 days and 30 days net, and charge for orders sent by parcel post.

PROGRESS IN TIRE BUILDING

THE problems solved in perfecting pneumatic tires up to date are veritable triumphs. They called for a broad knowledge of rubber, fabrics, compounds, chemistry and engineering. Fifteen hundred miles of service was high-water mark at one time. Whereas, today, thousands of miles are the rule. Anti-skid treads that wore smooth in a few hundred miles last into the thousands today. Beads that once blew out, let go and broke down, have become wholly dependable. It almost seems as if perfection had at last been sighted.

Not to yearn for the impossible but simply to indicate greater excellence one might suggest a study of side walls. Here is the circular hinge that by its constant

flexion gives ease in riding and estops vibration. To inflate the tire to the pressure advised by manufacturers minimizes the flexion and saves the tire, which is wise. Were, however, a flexible, non-destructible side wall possible, added comfort for the rider and longer life for the motor would be the result. If one could safely run tires with from ten to twenty pounds less inflation, riding joy, not joy riding, would be notably enhanced. The "impossible" in other lines has already been accomplished; in tire building, therefore it is to hope.

THE RUBBER TURN SOLE

SINCE the early days of the last century when ship captains with Brazilian cargoes first marketed in New England, as a side line, clumsy crude rubber boots, the hope has been cherished that rubber would prove more useful as footwear material than merely for the exclusion of moisture, important as that property was and always will be. Despite the discouragement of the multitude, who insisted that there was "nothing like leather," and often the covert opposition of great leather interests, inventors struggled on valiantly with the problem of making rubber take the place, in a larger measure, of tanned hides in footwear manufacture. As a result of innumerable tests and experiments there has been evolved a remarkably efficient and attractive line of rubber boots, bootees, arctics, and shoes, as well as fabric and felt rubber-soled foot covering, not to mention rubber heels and soles.

But the rubber men were not content with such a considerable achievement. There yet remained one great knotty problem to solve in order to wrest from the leather men their supremacy in the footwear trade. They would have to devise a better mode of attaching rubber soles to leather shoes than the nailing, stitching, or cementing as practiced by the repair men and a few leather shoe manufacturers who thus produced rubber-soled shoes for the occasional buyer. Well intrenched behind the turned leather sole, old line manufacturers felt sure that there was in that article at least one sure barrier to further trespassing by the rubber men on their preserves, and they confidently asserted that the most improbable thing was the production of a rubber sole in the making of shoes that combined the style, comfort, flexibility, and durability of the all-leather shoe.

As has so often happened in the rubber industry, the unexpected has come to pass, and not only has a practical turned sole been produced, but leather shoe manufacturers, sensing a fast-growing demand, are planning to employ them on a considerable scale as a part of original equipment. Even the vulcanizing of the rubber sole to the upper—long considered indispensable—is not required, ingenious machinery attaching the leather upper to a raised rib or shoulder near the edge of the rubber sole as neatly and as perfectly as though such sole were of the most approved leather model. Thus one of the strongest objections to the use of rubber as a tread for shoes has been overcome, and the desires gratified of even the most fastidious, who, while admitting all the advantages of rubber, have long been shy about being shod with rubber-soled footgear. Meanwhile a decided improvement has been made in the compounding of rubber and rubber-composition soles and heels, and such enhancement in quality, supplementing the better method of attaching rubber treads to leather or canvas uppers, may fairly be said to mark a revolution in shoe manufacturing full of great possibilities for the rubber industry.

As evidencing the increasing interest in this line may be cited the recent issuance of patents for rubber turned soles in the United States and Great Britain. One is for a rubber sole having a stitch-receiving strip embedded at the edge, and another is for an insert molded into the edge of a rubber sole to serve as a hold for stitching. Doubtless these are but the forerunners of even more notable inventions, and it seems reasonable to assume that resourceful rubber men, appreciating the fact that rich rewards await their successful endeavors, may soon treat the trade to some more important and agreeable surprises in this direction. Indeed, it may not be too much to expect that in the very near future there will also be produced a rubber upper that for wear, "class," serviceability, and craftsmanship may rival, and even possibly supersede, the time-honored leather vamp.

A CENSUS OF PRODUCTION

ONCE in two years the Government plans to take a complete census of articles produced by manufacturers great and small. The beginning will be about the end of 1921. Census number two will take place in 1923, and so on. So far there has never been an accurate count, for example, of the number of pairs of rubber shoes produced, although the total value of this product has been calculated to a cent. Of late, however, the price of materials, labor and finished products has varied so greatly that comparative figures on output are impossible. The last manufactures census was for 1919 and the new one will be for the year 1921, and of course will not be undertaken in detail until after the expiration of this calendar year.

Preparations are now being made to place this work on the new basis of production so that, hereafter, actual output per man power in various lines can be measured accurately regardless of the total value of the product or the widest possible variation, both in the factors which enter into production or the product.

All the figures regarding prices and expenses will be continued as heretofore, but in addition, the unit production figures will be of great assistance to the Government as well as all engaged in industry, especially in connection with export trade and the control of marketing.

Balloons, Airships and Rubberized Fabric

By C. P. Burgess[1]

In the opening years of the twentieth century the development of the gasoline engine of great power and light weight led speedily to the realization of man's ancient dream of flight by mechanical power, and also to the practical achievement of the dirigible balloon or airship which inventors and engineers had striven to attain ever since the ascent of the first balloon in France in the year 1783. The conquest of the air, which promises to be of immeasurable ultimate benefit to humanity, received a tremendous impetus through the great calamity which befell the world in 1914. During the four years of war, thousands of brilliant minds worked with unstinted funds to place the infant art of aircraft construction and operation upon a firm scientific basis. Their object was attained with marvellous success, and although aviation now finds itself in a deplorable condition as a result of the withdrawal of the war-time support, foliowed by the world shortage of capital, there is at least a well-established science ready for the service of man in the coming years of reviving prosperity.

THE PRINCIPLE OF AEROSTATICS

Balloons and airships constitute a class of aircraft technically designated aerostats, having the distinguishing feature that they are sustained in the air by buoyancy in the same manner as a vessel floating in the sea.

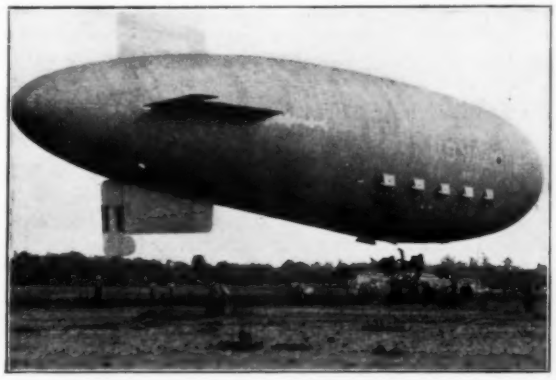
To float in the atmosphere, an airship must displace a volume of air equal to its own weight, or in other words, the mean density of the airship, including its structure, gas, suspended cars, machinery, fuel, crew, and military or commercial load must not be greater than that of the atmosphere which in ordinary life we regard as of almost negligible density. Such a drastic requirement can only be fulfilled by a thin shell or envelope enclosing a large volume from which the air is displaced. But although the atmosphere is of low density, about .075 pounds per cubic foot at sea level, the atmospheric pressure is very great, over a ton per square foot at sea level, and a sufficiently light shell would inevitably collapse unless filled with some substance to resist the external pressure. Light gases are the only substances of less than atmospheric density and capable of sustaining the atmospheric pressure.

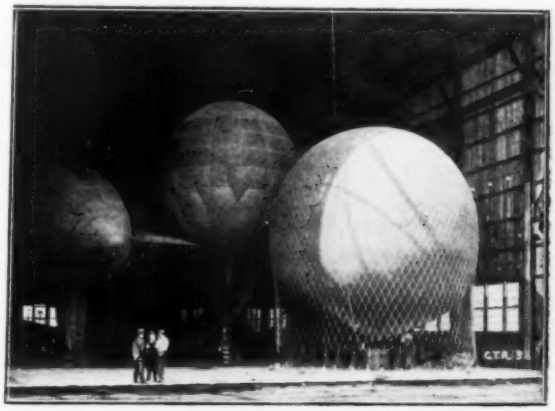
Hydrogen gas, having only one-fourteenth the density of air, is the ideal balloon gas as regards lift. Even a perfectly weightless gas, were such a thing possible, would gain only that one-fourteenth part more lift, because from the law of flotation the lift of a gas must be equal to the difference between its own weight and the weight of an equal volume of air. The objection to hydrogen is its inflammability, and this objection is absent from the inert gas, helium. Helium is twice as dense as hydrogen, but the lift is not very much less, as will be clear from the same considerations which showed that a weightless gas would not have much more lift than hydrogen. The difficulty about helium is its scarcity and cost.

There are three main classes of aerostats, or lighter-than-air craft. These are the free or spherical balloon, the kite balloon, and the airship—formerly called the dirigible balloon.

THE SPHERICAL BALLOON

The most primitive type is the spherical balloon, consisting primarily of a spherical envelope of fabric enclosing the gas, and covered by a cordage netting from which is suspended the car or basket for the aeronauts. From the bottom of the envelope hangs a tube of fabric, open at its lower end so that gas may escape and relieve the internal pressure when the heat of the sun or ascent of the balloon causes the gas to expand. There is also a manually operated valve for the release of gas at the top of the balloon. Vertical motion may be controlled by varying the buoyancy through release of gas or of ballast, but horizontally the balloon must go with the wind, and the pilot can control his direction only by searching up and down for the air current which blows most nearly in the desired course of travel. A spherical balloon used in this manner is called a free balloon.





U. S. Navy Non-Rigid Airship and Spherical Balloons. Built by The Goodyear Tire & Rubber Co.

It might be thought that the free balloon is obsolete in these days, but on the contrary, all airship pilots are agreed that complete mastery of the art of free ballooning is an essential part of the pilot's training, and free balloons are therefore still required for training purposes. It is agreed, too, that free ballooning is splendid sport, and in this respect it may be said that the free balloon is to the power driven aircraft as the sailing yacht is to the motor boat, or the horse to the automobile.

For military and naval purposes there is great use for the captive balloon, secured to the ground or to a warship by a cable. From a captive balloon the enemy's positions and movements can be observed, and the fall of shells noted and telephoned to the ground or to the towing vessel without danger of being "jammed" by the enemy, as sometimes happens to wireless messages. From a captive balloon a much more effective lookout for submarines can be kept than from the deck or masthead of a vessel. In the

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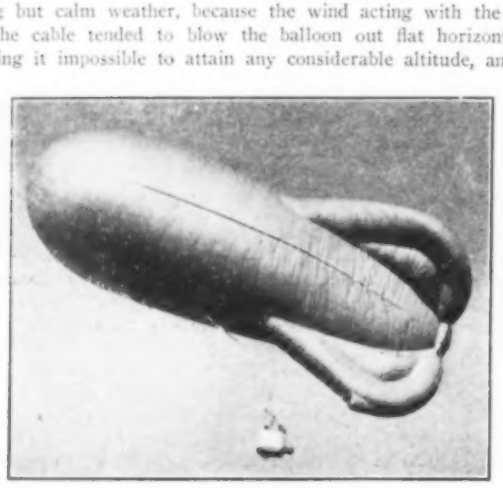
19th century captive spherical balloons were used both for military purposes and for public ascensions for people who desired to experience ballooning with perfect safety and certainty.

THE KITE BALLOON

The spherical balloon made a very poor captive balloon in anything but calm weather, because the wind acting with the pull on the cable tended to blow the balloon out flat horizontally, making it impossible to attain any considerable altitude, and at



U. S. NAVY KITE BALLOON

the same time causing such violent jerks to the balloon and its basket that good observation was impossible. To overcome these difficulties, an elongated balloon with stabilizing surfaces acting like vanes was developed. Owing to its shape and the stabilizing surfaces this type of balloon has a kiting action in the wind, giving a dynamic lift to help the buoyancy of the balloon to sustain the pull of the cable. The surfaces also steady the motion of the balloon. The Caquot kite balloon, invented during the war by Captain Caquot of the French Army, is the most highly developed balloon of this type. Caquot kite balloons were made and used in large numbers during the war by the French, British, and Americans. The Germans also made great use of the type, copying the allied balloons. The Italians developed a slightly different design of kite balloon, the Avorio-Prassone, based on similar principles to the Caquot.

The essential features of the kite balloon are an elongated envelope of rubberized fabric, fitted with stabilizers of light rubberized fabric and within the envelope a rubberized fabric diaphragm forming a ballonet. The function of the ballonet is to give a gas space of variable volume, so that when the gas contracts due to variation of temperature or altitude, air caught by a scoop on the under side of the envelope enters the ballonet space, raises the ballonet diaphragm and maintains sufficient pressure in the envelope to preserve the shape. Without this device a kite balloon or non-rigid airship would become a shapeless and unmanageable mass of flapping fabric whenever the gas contracts. Conversely, when the gas expands, air is forced out of the ballonet, and if the gas continues to expand after the ballonet is empty, the gas valve opens, permitting gas to escape.

The stabilizers hang limply in a calm, but in a breeze they are inflated by an air scoop. The basket and cable are suspended from the balloon by rigging attached to a band of fabric running longitudinally around the envelope.

Aside from military and naval purposes there is little use for the kite balloon, unless it is for study of the atmosphere with small kite balloons carrying recording meteorological instruments. Doubtless the use of such balloons will give much valuable data on atmospheric conditions, and may lead to important improvements in weather forecasting.

THE AIRSHIP

By far the most important class of aerostat is the airship. Here we have a diversity of type and complexity of design and construction which within the limits of our space can only be hinted at. Essentially the airship comprises a gas-holding envelope or hull, shaped to have low resistance to forward motion, and fitted near the stern with fixed vertical and horizontal fins, and vertical and horizontal rudders to give control of the direction laterally and vertically; and suspended from the hull are the cars, carrying the passengers and crew, engines and propellers, fuel, useful load, and the multiplicity of controls and instruments. In some types of airships there is a central corridor along the bottom of the hull, forming a passageway for the crew, and containing the fuel tanks, water ballast bags, and bombs.

Three main types of airship have been built in considerable numbers, but here as elsewhere in general classifications, there are borderland specimens which show how the dividing line between types may be crossed imperceptibly. The three types are the non-rigid, semi-rigid, and rigid airships.

NON-RIGID AIRSHIP

The non-rigid airship has an envelope of rubberized fabric, maintained in shape by the gas pressure, and fitted with internal air ballonets to compensate for changes in the volume of gas. Valves are fitted for release of gas and air; and air is forced into the ballonets by scoops in the air stream from the propellers, or by a blower in the car. Usually there is only one car, and one or two engines and propellers. The great advantages of the non-rigid airship are comparatively low cost and the ease with which the envelope can be set up, or deflated and stowed away, or packed for shipment. Its disadvantage is dependence on careful control of gas pressure between narrow limits. If the pressure rises too high the envelope would burst, although ample valve area makes this impossible, but almost equally fatal is a loss of pressure, permitting the envelope to lose its shape.

SEMI-RIGID TYPE

The semi-rigid airship also has an envelope of rubberized fabric, but a girder keel is provided to give stiffness and render the airship less dependent upon gas pressure for maintenance of shape. A lower gas pressure and hence a lighter weight of fabric is permissible than in non-rigid airships. The bending forces are so

PRINCIPAL CHARACTERISTICS OF SOME TYPICAL AIRSHIPS

Class or Designation	Nationality	Type	Volume Cu. Ft.	Length Ft.	Diameter Ft.	Height Ft.	Gross Lift Lbs.	Useful Lift including Fuel, Lbs.	Horse-Power	Speed m.p.h.	When Built
C	United States	Non-Rigid	180,000	192	43	57	12,200	4,100	250	60	1918
N. S.	British	Non-Rigid	360,000	262	54	69	24,400	9,700	500	56	1918
Zodiac	French	Non-Rigid	327,000	264	49.5	76	22,200	8,000	500	50	1918
Parseval	British	Non-Rigid	348,000	300	50	76	23,700	10,000	360	48	1916
A	Italian	Semi-Rigid	635,000	322	64	82	43,100	22,000	900	53	1917
M	Italian	Semi-Rigid	441,000	269	59	89	30,000	13,000	440	46	1917
O	Italian	Semi-Rigid	127,000	177	35	58	8,650	3,200	250	54	1918
Roma	Italian-United States	Semi-Rigid	1,200,000	410	80	90	81,600	48,000	2,400	80	1920
PL—27	German	Semi-Rigid	1,100,000	518	64.3	..	74,700	39,600	960	56	1917
M—IV	German	Semi-Rigid	687,000	396	53	..	46,700	15,400	480	50	1914
L—70	German	Rigid	2,400,000	743	78.4	90	163,000	88,000	2,030	80	1918
Bodensee	German	Rigid	796,000	425	61.3	70	54,100	25,300	960	82	1918
LZ—125	German	Rigid	3,500,000	771	98	110	238,000	132,000	2,880	87	Projected
R—34	British	Rigid	2,013,000	643	78.7	92	130,000	61,600	1,250	62	1919
ZR—2	British-United States	Rigid	2,724,000	695	85.5	93	176,000	102,000	2,100	72	1921

distributed that the keel takes compression, while the fabric receives a moderate tension. Balloon fabric is a very efficient material in tension, and it is therefore possible to give the semi-rigid airship an exceptionally light construction, permitting a relatively greater useful load to be carried, and greater altitude to be attained than with other types of airships of equal size.

With the exception of the keel in the envelope, small semi-rigid airships resemble non-rigids in their general features. Large semi-rigid airships may have a multiplicity of cars and engines, and a keel corridor. Semi-rigid airships are rather more costly and less easy to erect than the non-rigid type.

RIGID AIRSHIP

The rigid airship is the largest and most complex of all aircraft. In speed and carrying capacity it exceeds all other types of airship. The hull is an intricate structure of duralumin girders and steel wire. This structure is covered by an envelope of tightly drawn single-ply cloth. Within the hull structure there are from eleven to nineteen separate gas bags, made of single-ply cloth, lined with gold-beaters' skin to give gas tightness. In British and American practice the gold-beaters' skin is held to the cloth by a thin layer of rubber; but the Germans use glue. The rigid airship is entirely independent of gas pressure for maintenance of form, but a deflated gas bag may cause large stresses in the structure because of the pressure of the neighboring bags upon the transverse frames. The hull contains a keel corridor, and there are several cars and engines.

IMPORTANCE OF THE FABRIC

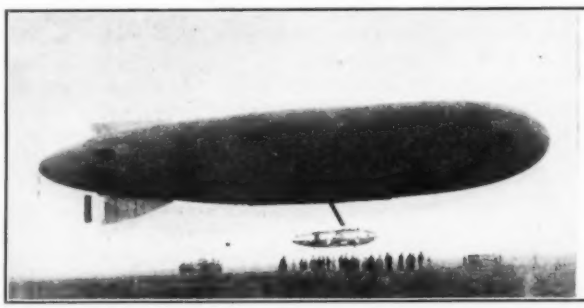
By far the most important structural feature in an aerostat is the hull or envelope. In spherical and kite balloons and in non-rigid airships the envelope is almost entirely constructed of rubberized fabric. In semi-rigid airships the rôle of rubberized fabric is slightly less important, and in rigid airships it sinks to comparatively minor importance.

To understand the function of the fabric it is necessary to consider briefly the nature of the stresses in the envelope. The term "pressure in the envelope" refers to the difference between the absolute internal and external pressure, and it is very small in proportion to the absolute pressure. The pressure in the envelope is measured in inches or millimeters of water. One inch of water equals 5.2 pounds per square foot. Pressure above two inches of water rarely occurs in balloons or airships. When ascending in the atmosphere the weight of air above continually diminishes, and hence the pressure, density, and buoyancy of the atmosphere also diminish. Since the gas is less dense than air, the absolute pressure in the envelope diminishes upwards less rapidly than the absolute pressure of the surrounding air. It follows that the relative pressure in the envelope increases upwards; the rate of increase is nearly one inch of water per 100 feet. It is this increase of pressure upwards that gives the lifting force to overcome the weight of the balloon or airship. The internal gas pressure also gives stiffness to the envelope against bending forces, and opposes the outside air pressure on the bow due to forward motion. Although a pressure of only one or two inches of water may seem small, the transverse tension in a cylinder is equal to the product of the pressure per unit area and the radius of the cylinder. The longitudinal tension is half as great. Bending forces on the envelope also produce longitudinal tension or compression to be added to or subtracted from the tension due to gas pressure; and to prevent collapse of the envelope, the pressure must be high enough for the tension to exceed the compression. A non-rigid airship 200 feet long by 45 feet diameter requires fabric having a strength of about 80 pounds per inch-wide strip.

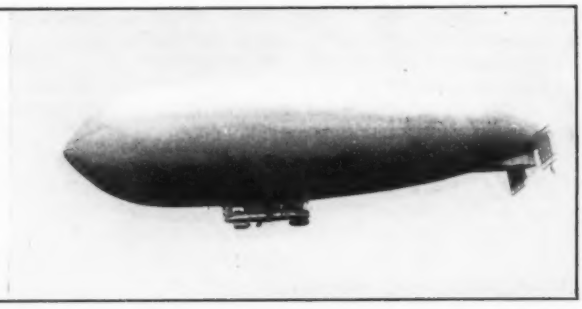
Early balloons were constructed of silk or linen, made reasonably gas-tight by varnishing. But the leakage or diffusion of the gas was very considerable; and handling the balloon cracked the varnish. A thin membrane from the internal organs of the ox, about 6 inches by 30 inches from each animal, was found to be almost perfectly gas-tight and very light. This membrane is called gold-beaters' skin. Unfortunately, gold-beaters' skin is very expensive and its use is now almost entirely discontinued, except for lining the gas bags of rigid airships.

THE ACHIEVEMENT OF RUBBERIZED FABRICS

A fabric of moderate cost, strong, light, gas-tight, and capable of being handled and folded without damage is essential for the development of balloons and airships. These requirements are fulfilled by rubberized fabric. The fabric is usually constructed with one or two plies of cloth for free balloons, two plies for kite balloons, and three plies for airships. Rubber between the plies binds the cloth together and constitutes the gas-tight film. A layer of rubber intended only as a binder between plies of cloth must weigh about 1.5 or 2.0 ounces per square yard, and to form an efficient gas film it must be from 2.6 to 3.6 ounces per square yard. The outside of the fabric is rubberized for weather-proofing, and the outside rubber is usually mixed with aluminum powder to give a surface that reflects the rays of the sun, which are destructive to rubber, and also prevents excessive heating of the fabric and the gas. Sometimes the aluminum is printed on the rubber. Usually the inside is thinly proofed with rubber as a protection against moisture. The requirements of balloon cloth are maximum attainable strength in proportion to the weight, and also a close weave so that the rubber may fill all the interstices. The cloth is made of the highest grade of sea island cotton.



FRENCH NON-RIGID AIRSHIP—CHALAIS-MEUDON TYPE



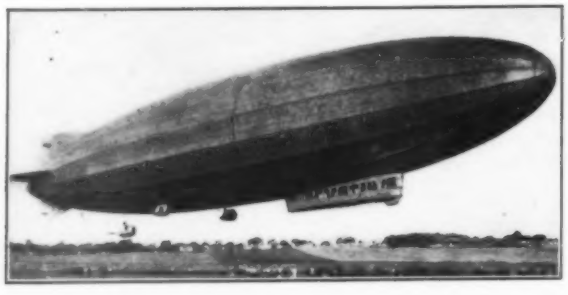
ITALIAN SEMI-RIGID AIRSHIP—FORLANINI TYPE

THE MANUFACTURE OF BALLOON FABRIC

In the manufacture of rubberized balloon fabric, the raw cloth is first passed over a glass table illuminated from below, and all defects are removed. A sample of each roll is tested for weight, strength, and thread count to see that it is up to specifications. The cloth is then run through the spreading machine in which the mixture of rubber and vulcanizing ingredients, resembling thin putty in appearance and feeling, is spread uniformly over the cloth. Each spreading is so very thin that sometimes about thirty passes through the spreader are neces-

sary to make up the required weight of rubber per square yard. One of the two or three plies of cloth in the fabric consists of bias-cut pieces with the threads inclined at 45 degrees to the edge of the fabric. The bias pieces are cemented together to form a continuous roll. The straight and bias rolls are run through a machine which presses them firmly together, and the rubber being still in a sticky or "uncured" state forms an adhesive binder. A clean piece of cloth is wrapped with the spread cloth to prevent it from sticking to itself before the process of binding the plies together.

The bias ply of cloth contributes very little to the strength of the fabric in the principal directions; but it is very effective



GERMAN PASSENGER AIRSHIP "BODENSEE"—RIGID TYPE. BUILT SINCE THE ARMISTICE

in increasing the resistance of the fabric to tearing, and it prevents diagonal distortion of the envelope.

The fabric is then rolled on a drum and lowered into a heater in which steam vulcanizes the rubber. The temperature and pressure of steam, and the duration of the curing process are very important matters, and it is here that each manufacturer is apt to consider that he has "got something" on his rivals. The finished fabric is again inspected for flaws by passing it over a glass table illuminated from below, and samples are tested for weight, strength, and gas-tightness.

CONSTRUCTION OF THE ENVELOPE

The envelope is constructed in strips or "gores" of fabric running longitudinally. Sometimes the gores are continuous rolls of fabric, but more usually they are made up of panels of fabric, in which the warp threads—the threads running the length of the roll—are transverse to the gores.

Seams between adjacent panels and gores are made by overlapping the fabric about an inch and cementing with rubber cement. Stitching is also used to reinforce the cement and to hold the fabric while the cement is setting; but even without stitching, the seam is 100 per cent efficient, that is, it is as strong as the cloth. Over both the outside and inside of the seam, strips of bias tape are secured as protection against moisture and the weather, and to prevent diffusion of the gas through the holes made in the fabric by the stitching. The tape is spread on one side with uncured rubber in a sticky condition so that it adheres to the fabric. Patches for securing the car suspension cables and accessories upon the envelope are cemented to the fabric with rubber cement without any stitching.

ADVANTAGES AND DISADVANTAGES OF RUBBERIZED FABRICS

Rubberized balloon fabrics are sufficiently satisfactory as regards strength, impermeability to gas, flexibility, lightness, and cost; and not very much improvement is to be expected in these qualities, although some development is possible in a system of thread or tape reinforcement scientifically applied in the direction of greatest stress, instead of using a fabric of nearly uniform strength in all directions. Such a development would be analogous to the use of cords instead of fabric for automobile tires.

A serious fault in all balloon fabrics yet produced is the rapid rate of deterioration, particularly in strong sunlight. Even with aluminum powder and protective dyes in the outside proofing, the rubber begins to perish before many months' exposure to sunlight. This perishing is an oxidizing process, and can be measured by the amount of acetone extract yielded by the rubber. Not only does the fabric lose its gas-tightness by this process, but the acetone attacks and weakens the cloth. Improvement of the fabric by protection against deterioration in sunlight still offers a promising field of research for the rubber chemist.

THE FUTURE OF THE AIRSHIP

The airship and the airplane have widely different attributes and capabilities, so that there can be little competition between them. The advantage of speed for limited distances is all with the airplane; but the airship has the great advantage that it is sustained in the air without expenditure of power. For patrol duties, and for sight-seeing or excursion cruises where time in the air rather than speed is desired, the airship is immensely superior to the airplane. For long non-stop journeys of upwards of a thousand miles, carrying large loads of passengers and mail at high speed, the large rigid airship is the only type of aircraft combining sufficient carrying capacity, endurance and speed.

It is sometimes thought that there will be little use for the small or medium sized airship, that is, the non-rigid or semi-rigid; but it should be remembered that travel is by no means confined to the business man, counting his time as money, and rushing from New York to Chicago or London with the utmost dispatch. A large part of our national traveling is done for pleasure or on vacation, and here the moderate-sized airship, cruising at the comparatively leisurely rate of 50 miles an hour, presents the most perfect solution of pleasant traveling in the air at moderate cost. There will be comfort, relief from summer's heat, and the splendid panorama of the scenery under the most favorable circumstances for the vacation traveler or the excursionist. And even the hurrying business man is known to find his time less costly when pleasurably occupied. It appears, therefore, that there is an ample field of usefulness for the non-rigid and semi-rigid airship; and rubberized fabric of enduring quality is the most essential material in the construction of such airships.

TIRE AND RIM ASSOCIATION

The Tire and Rim Association, during the month of August, 1921, inspected and placed its stamp of approval on 1,114,542 rims for pneumatic tires, in the various rim plants of the United States and Canada, which number is divided into the following sizes:

Size	Number
26 x 3	79
30 x 3	100,874
30 x 3½ Clincher	569,214
30 x 3½ Straightside	29,500
32 x 3½	32,331
32 x 4	233,511
33 x 4	67,368
34 x 4	5,064
32 x 4½	32,346
34 x 4½	40,081
36 x 4½	409
34 x 5	3,529
36 x 6	209
38 x 7	13
40 x 8	14
Total	1,114,542

A Glossary of Words and Terms Used in the Rubber Industry—VIII[1]

By Henry C. Pearson

Pneumatic Tire Definitions[2]

FABRIC CHAFING. Wearing away of fabric through inter-rubbing of threads, or plies.

FABRIC (General). Cloth, woven, knitted, braided, or felted from vegetable, animal or mineral fibers.

FABRIC (PNEUMATIC TIRE). (1) Fabric Tire Fabric: Square-woven cotton textiles used in the manufacture of tires. In the pneumatic tire they comprise builder fabric, breaker fabric, chafer fabric, and bead fabric. See Builder Fabric, Breaker Fabric, etc. (2) Cord Tire Fabric: Cotton textile builder fabric consisting of warp threads lightly held in place by thin woof tie-in threads. See Cord Tire. (3) Thread Fabric: A sheet of rubber into the surface of which are lightly pressed warp threads closely lying but not touching one another. See Thread Fabric and All-Warp Tire. (4) Bicycle Tire Fabric: Light, square-woven, cord or thread fabric used in building bicycle tires. See Bicycle Tire Fabric. (5) Inner Tube Fabric: A light open-weave fabric used in inner tube reinforcement. See Fabric Reinforced Inner Tube. (6) Accessory Fabrics: Fabrics used in preparing, constructing, or finishing tires and in flaps and interliners, but not in integral part of the tire. See Sheetings, Osnaburg, Tape, Holland and Interliners. (7) Repair Fabric: Fabrics used in repair patches, sections, etc., etc. See Repair Materials. (8) Reclaimed Fabric (Pulled Fabric): Builder fabric stripped from discarded tires. See Reclaimed Fabric. (9) Tubular Fabric: Fabric woven in tubular form and used in hosepipe tires. See Tubular Fabric.

FABRIC REINFORCED INNER TUBES. Tubes overlaid with one or more plies of fabric designed to make them more resistant to wear.

FABRIC ROT. Deterioration of woven material in a casing due to the entrance of moisture.

FABRIC SEPARATION. Separation of the rubberized layers in a casing.

FABRIC TIRE. A pneumatic tire, the carcass of which is formed of rubber-impregnated (friction) and skim-coated, square-woven fabric.

FACTORY BLEMISHED. See N. F. C.

FACTORY FAULTS. Defects in material, workmanship, etc., noted in inspection and requiring the branding of tires and tubes as N. F. C., blemished, or seconds. See N. F. C.

FAIR TRADE PRACTICE. Acts in merchandising that injure neither buyer, seller, agent nor consumer. The Golden Rule applied to commerce. The 31 articles of the Automotive Equipment Association.

FAST TIRE. A colloquialism for an exceptionally resilient tire.

FASTENING. The method of securing a tire to a rim. Generally effected, in the case of pneumatic tires, by either springing a tire with extensible edges into a rim having channeled edges, as with the clincher type, or clamping it in place with a flat, bolted-on ring, as with the straightside type. See Rims.

FEATHER-EDGE. A tapered or skived edge as on reliners, flaps, blowout patches, etc; also a similar edge on tube or fabric stock used for repairing.

FELLOE (Felly). See Rim.

FENDER CUTS. Tread cuts, or abrasions often extending fully around the tire, usually caused by projecting fender bolts. See Wear.

FILLER. (1) A crescent-shaped, endless cover of rubber to safeguard an inner tube; also an interliner of fabric plies for a casing. See Floating Flap. (2) Compounds of glue and glycerine or oxidized oils in liquid form injected into casing or tube Sponge rubber, alone or with felt, ground cork, rubber substitute, leather scraps, animal hide, gelatine, etc., is sometimes molded in sections to fill the bore.

FILLER GUM. A quick-curing, low specific gravity, unvulcanized rubber compound for repairing inner tubes. Inside or combination gum consists of a layer of uncured gum backed with a layer of semi-cured gum, outside gum consisting wholly of unvulcanized rubber.

FILLER THREADS. Light single-strand weft or cross threads holding the warp cords in cord fabric together, usually spaced one-third of an inch apart. "Tie-in" threads, or "picks."

FINISHING. The final operation in tire making. Rasping or buffing off the burr or mold marks, painting the inside of the casing with a talc mixture to prevent it from sticking to the inner tube, and scrubbing the outside of the casing.

FIRST VULCANIZING. The semi-curing of a built-up carcass before the breaker strip and tread are applied. See Double Cure.

FLANGE-FIXING TYRE. A British term for a detachable or straightside tire in which fastening to a rim is effected with two ring flanges and from ten to twelve bolts.

FLAP. See Floating Flap.

FLAT-FOOT TYRE. A British term for the straightside tire.

FLAT TREAD. A variation from the conventional rounded tread developed in 1904 and providing a flat, or nearly flat, surface for that part of a tire in direct contact with the road; often called a raised tread, and classed as an early non-skid type of tire.

FLATTENING. Partial or complete collapse of a tire due to deflation of a tube.

FLEX (Flexing). To bend, bending.

FLEXIBLE BEADS. Extensible edges, as of clincher tires, intended to facilitate springing a tire on a non-split rim with incurved flanges. See Clincher.

FLEXING POINT. That part of the outer side of a casing which bends or bulges most under weight compression or while running; ordinarily about midway on the side walls between bead and tread.

FLIPPER STRIP. A narrow strip of frictioned fabric lapped about a bead. See Beads.

FLOATING FLAP. A loose strip of rubberized fabric, endless or with lapped ends, with feathered edges, applied between a casing and the inner circumference of an inner tube to save the latter from pinching by the tire beads.

FLOATING TUBES. Pure or slightly compounded inner tubes, the specific gravity of which being low prevents sinking when immersed in water. As a test for quality of material it is excellent provided cheapeners of equally low gravities have not been added in the compounding.

FRICTION. (1) To force rubber, as with a friction calender, into the interstices of fabric; cotton duck thus rubberized is called friction or frictioned fabric. (2) A term applied to the adhesion of tread to carcass or to the cling of fabric layers one to another. See Adhesion. (3) Rubbing of the threads of a fabric against one another, or the cables in a cord tire, during the flexing of a tire, generating heat and inducing ply separation.

FRICTION FABRIC (Frictioned Fabric). A fabric, the interstices of which are more or less filled with a very adhesive rubber by the use of friction rolls on a calender. Fabric rubberized by use of solution on a spreader or in an impregnator.

FRICTION STRENGTH. The resistance to separation between

[1] Continued from the THE INDIA RUBBER WORLD, September 1, 1921, pages 882-887.

fabric plies, or between fabric and rubber after vulcanization, the pull being expressed in pounds. See Specifications.

FRICTION TAPE. Strips usually ¾ of an inch wide cut from adhesive rubberized sheeting with warp threads running in straight lines. It has a thickness varying from .913 to .017-inch; tensile strength averages 30 pounds to the inch. Used in wrapping some inextensible core beads and in emergency tire repair. See Repair.

FULL-MOLD TIRE. A tire casing built complete, and cured at one operation in a mold; a single-cured tire. See Vulcanization.

FULL SECTION REPAIR. An outside casing repair usually made for an extensive blowout and reaching entirely across a tire, requiring tread layback and stepping out of damaged fabric.

GAITER. See Boot.

GIANT PNEUMATIC. An extra-size pneumatic tire used for trucks and heavy passenger vehicles. See Sizes.

GRAY TUBES. Inner tubes having a gray coloring due to the compounds used, as zinc oxide, or to the efflorescence of sulphur.

GREEN CEMENT. Cement from which the solvent has not evaporated.

GREEN GUM. Unvulcanized rubber.

GRIEF. A colloquialism for tire damage or rough usage.

GROOVED TIRES. Tires which have treads with crosswise or transverse concavities designed to afford better road-grip.

GROUND BEAD CORES. A reclaimer's term for pulverized rubber made of the beads of discarded tires.

GUARANTEE (Guaranty). A pledge of mileage for a tire made by a manufacturer for which an adjustment is effected if materials or workmanship be found defective. Adjustment is ordinarily based on 8,000 miles of service for cord and 6,000 miles for fabric tires, some manufacturers making it higher. An allowance for undelivered service of a tire failing through a factory defect to yield average mileage. Mileage used is debited in the reckoning, account being taken of reasonable care, type of roads traversed, etc. Instancing the case of a guaranteed cord tire failing after 4,000 miles use, a replacement—new tire—would be allowed the user, who would be charged 50 per cent of the price of such new tire for the service rendered by the old tire.

GUM. A trade name for raw or partly-cured rubber.

GYPS. A colloquialism designating dealers in seconds, rebuilt, shoddy or blemished tires when sold as first-grade goods; also gyp tires. See N. F. C.

HALF-SECTION REPAIR. Removal of damaged portion and insertion of new material where the injury is between the tire tread center and the bead.

HALF-SOLE TIRES. A trade term for retread bands, with or without breaker strip and cushion attached, to be vulcanized over a tread-worn casing.

HAND-BUILT. Tires constructed mainly or wholly without the use of tire building machinery.

HARD CLINCHER BEAD. The bead on one type of quick detachable tire made with a hard, inelastic core, often strengthened with a steel wire or cable to check its stretching, and used on rims with a removable side ring. See Beads.

HEAT EXPANSION. Increase in the internal stress of a tire due to a rise in the temperature of the air in the tube. Most of the heat generated in a tire is due to internal friction from constant flexing, rather than outside temperature.

HEATING. A rise in temperature, due largely to friction caused by continual flexing, rubbing, or sliding on one another of the fibers and threads composing carcass fabric or its several plies. Tendency to heating is more marked in fabric than in cord tires; it is lessened by full inflation and increased by underinflation and by speeding.

HEAVY CORD TIRE. The original cord tire made of two plies of stout, hawser-like, plain-laid, 3-strand rubber-impregnated cotton cords. See Cord Tire.

HOLLAND. A glazed cotton textile used for wrapping gum or frictioned fabric to keep the layers from adhering.

HOOK-ON-BOOT. An emergency device used instead of an inside blowout patch and hooked over a casing. See Boot.

HOSEPIPE. A term applied to single tube tires.

IMPACT. Alteration of momentum in direction and force in a tire as the result of road blows. See Tests.

IMPRESSION PAD. Fabric with an extra heavy coating of rubber used to preserve a tread design in retread work. It is coated with talc, heated, given the desired tread design, vulcanized, and used as a mold in sectional repairs. See Matrix.

INDIA RUBBER. The most important basic material in pneumatic tire construction. The unit of value among the many grades of wild and plantation rubber is Pará rubber. Rubber into which is incorporated only sulphur for vulcanization is known as pure rubber. Mixed with sulphur and various organic and inorganic materials to promote adhesion, toughness, resilience, homogeneity, etc., it is known as rubber compound. In solution, the usual solvents being naphtha or benzol, it is called rubber cement.

INFLATION. Distension of an inner tube with compressed air or gas.

INFLATION TABLE. A chart indicating the proper degree of distension of an inner tube with compressed air or gas for various standard sizes of tires, based upon load. See Sizes.

INNER TUBES. Circular hollow sealed tubes, round in cross-section, of pure or compounded rubber, adapted to fit within a tire casing, with attached air valve for inflation. The appurtenances of an inner tube are valve patch, valve pad, and valve, vulcanized together with the tube as a unit. See Butt-End Tube, Cord Tire Tube, Compression Tube, Machined Tube, Molded Tube, Pure Gum Tube, Rolled Tube, Seamed Tube, Spliced Tube, Wrapped Tube.

INSIDE BLOWOUT PATCH. A patch made usually of 11-ounce rubberized fabric with a center of 14-ounce rubberized fabric, with flaps to go over the beads.

INSIDE REPAIR. Mending of damaged casings by inside section, patches, reliners, etc. As applied to inner tubes, cementing patches beneath rents or holes, about valve seats, etc.

INSIDE SECTION REPAIR. A section repair to the interior of a casing not below the tread line, where the injury is slight and lifting of the tread unnecessary.

INSPECTION. Close scrutiny of a finished casing by an expert to detect defects in appearance, material, weight, or workmanship.

INTERCHANGEABLE SIZES. See Sizes.

INTERNAL FRICTION. Rubbing together of threads, cords, or fabric by intermittent and varying distortion of a tire in use. See Friction.

INTERNAL PRESSURE PROCESS. A mode of curing employed for cord and cord fabric tires in which an inflated air-bag supplies pressure.

JEANS. A strong cotton twilled fabric used as a cover for cord tire beads.

JOINTED TUBES. See Butt-end Tubes.

JOINTLESS TUBES. See Molded Tubes.

KETTLE CURE. A method of vulcanizing tires by placing them in a steam-filled vessel; used in repair work. See Repair.

KIT. See Accessory Kit.

LACE-ON BOOT. An emergency boot for blowouts laced over a break on the outside of a casing. See Boot.

LAMINATED TREAD. A tread made of layers or plies of rubber formed and cured into a unit, to correct possible microporosity.

LAMINATED TUBE STOCK. A tube stock made of thin layers of nearly pure or compounded rubber formed into a single sheet to insure greater strength, and overcome microporosity.

LAYBACK (Layback Section). A tread cut on three sides and turned backward on the casing to facilitate repair of the fabric beneath.

LEAKY SPLICE. A defect in the original union of the ends of an inner tube, or in repair-curing of tube ends, allowing escape of air at the lap.

LEATHER TREAD HOOK-ON BOOT. A tire boot for temporary re-

pair made of layers of frictioned fabric, with a tread of heavy leather, steel studded, and adjustable hooks to clamp on rim over a damaged tire. See Boot.

Leatherized Tire. A rubber casing with tread surface, and sometimes sidewalls of leather, often metal-studded to protect the tread.

Life. Length of tire service dependent upon materials, construction, vulcanization, and usage. See Aging Qualities.

Light Cord Tire. A term sometimes used for the cord fabric tire in contradistinction to the heavy cord tire. See Cord Fabric Tire.

Light Fabric. A tire building and repair fabric of light-weight close-woven cotton duck frictioned on two sides, and used for chafing strips and for bicycle and motorcycle casings.

Lining. The inside wall of a casing; the band ply.

Load. The maximum weight that may be borne without injury by a tire inflated to proper pressure. See Axle Load and Sizes.

Long Staple Fabric. A tire fabric made of long fiber cotton as Sea Island, Pima, Sakellarides, etc., and affording much tensile strength. See Cotton.

Machine Tubes. Inner tubes formed by forcing rubber tube material, while heated, through a die which determines the thickness of the wall and diameter of the tube.

Matrix. A curved, impressed metal or fabric and rubber mold used to impart a tread design in repair.

Maximum Load. The utmost weight a tire may support at standard inflation. See Sizes.

Metric Measurement. Designation of tire, tube, or rim size, by the metric system, the reckoning being done on a millimeter instead of an inch basis.

Mileage. The distance service obtained from a tire in use. See Guarantee.

Misalinement. A condition of tires in service in which they do not run true or are out of line, due to defective axles, spindles, bearings, etc., or improper setting of demountable rims; resulting in a side-grinding of the tread.

Misplaced Bead. A tire defect whereby, in curing, a bead fails to sit properly in place. See Beads.

Misplaced Wire. A tire defect due to the slipping of a wire cable from the center of a bead core in the curing of a carcass.

Mold Marks. Burrs or fins on the external surface of a casing from overflow rubber at the juncture of the mold parts.

Molded Jointless Tubes. A British term for an inner tube of continuous type molded in complete circular form.

Molded Tube. An inner tube vulcanized as a single unit in a circular mold.

Molding Process. The method of vulcanizing a built-up casing and impressing a tread design by inclosing the casing in a steam-heated mold.

Motorcycle Blowout Patch. An outside casing repair patch usually of four plies of close-woven frictioned fabric, feather-edged, and with double flaps to lock over beads. See Patches.

Motorcycle Hook-on Boot. See Boot.

Motorcycle Lace-on Boot. See Boot.

Motorcycle Racing Tire. A special tire of the clincher type for racing, but having a smaller vertical cross section measurement than the regular motorcycle tire. See Sizes.

Motorcycle Reliner. An open-end reliner usually made of three plies of close-woven frictioned fabric. See Reliner.

Motorcycle Tire (Regular). A pneumatic tire of the clincher type having the general characteristics of an automobile tire, but with only three or four plies of fabric in the carcass, having breaker strip, cushion, thick center tread, and semi-hard beads. See Sizes.

Motorcycle Tire Rim. The clincher type of rim. See Rims.

Mounting. The proper application of a tire to a rim to avoid tube pinching, rim cutting, and to insure safe locking, and true alinement.

Multiple-Ply Cord Tires. Cord tires made of 6, 8, or more plies of warp cords. See Cord Tire.

N. F. C. ("Not first class.") A trade term applied to tires and tubes which fail to pass factory inspection; branded thus on sidewall, bead, or inside of tire; usually sold as seconds. Brand marks are sometimes buffed off by unscrupulous dealers and the tires are sold as first-class.

Negative Curing Pad. See Impression Pad.

Nipping. Pinching of an inner tube between the wheel rim and bead toe, bead and rim bolt, bead and valve, or from unskilful use of a tire tool.

Non-Skid. A tire with the tread so designed as to secure traction and to check slipping or skidding. See Treads.

Non-Slipping Tread. A British term for a tread having two or more circumferential grooves, or three or more parallel, flattened ribs extending lengthwise around its surface, and designed to avert skidding. See Ribbed Tread.

A DISTINGUISHED DUTCH RUBBER CHEMIST

The plantation rubber industry from its inception has developed under the guidance of scientific study and control. Prominent among the eminent botanists and chemists working to further develop the industry is Dr. Otto de Vries, director of the Central Rubber Station, Buitenzorg, Java, since its erection in 1915. Research under his management has led to practical methods of control, valuation and test, making possible the production of uniform standard plantation grades.

Dr. Otto de Vries

The researches of the Central Rubber Station are to be found in the files of *"Archief voor de Rubbercultuur in Nederlandsch-Indië."* In addition to many scientific papers on crude rubber topics Doctor de Vries is the author of a comprehensive treatise on plantation rubber, entitled "Estate Rubber, Its Preparation, Properties and Testing," which appeared early this year. It contains a very complete review of the work thus far done on the subject.

ANNUAL MEETING OF THE S. A. E. TO BE HELD IN JANUARY

The Society of Automotive Engineers will hold its annual meeting in New York, N. Y., January 10-13, 1922, during the National Automobile Show week, when interest is centered in these kindred industries. Plans for the various sessions of the convention are being developed, and the indications are that the program will be very comprehensive. Members desiring to present papers should communicate with the society offices at 29 West 39th street, New York, N. Y.

PEACHEY PROCESS IN AMERICAN INDUSTRIES

Announcement has been made by The Peachey Process Co., Limited, with offices at 83 Pall Mall, London, S. W. 1, England, of the proposed formation of an American corporation which will license manufacturers wishing to adopt this new process.

American representation of the Peachey process has been recently secured by J. D. Maguire, of the Salem Manufacturing Co., and president of the Maguire Rubber Co., 200 Fifth avenue, New York, N. Y. This method of cold vulcanization has been fully described in The India Rubber World.

Practical Development for Foremen

By James Wright Cary

THE TYPICAL FOREMAN

OCCASIONALLY a psychologist with the assistance of a photographer amuses the public with delineations of a "composite man." This is done by superposing portraits of a number of persons in the attempt to evolve therefrom the predominating type. No doubt the psychologist takes himself very seriously, and incidentally supplies the public with a passing diversion.

In the practical realm of mechanics, however, is to be heard more and more the demand for a real composite man. Oddly enough, this demand centers about those who hold the position of foreman, and is a radical departure from the attitude of the old days. What was then required was a "boss," and only those who possessed this qualification could hold down the job. Knowledge of the work was of course necessary, as well as a knowledge of men, and with this equipment the average foreman became a person of considerable importance.

It was only after modern ideas of factory management began to creep in that it was suspected that a higher grade of foreman was necessary. A lot of welfare philanthropists bobbed up who were sure that the foreman had too much detail thrown upon his shoulders. They declared that to hire and discharge help, to set the rate of wages, plan the work, make the repairs, order the supplies, adjust differences, and a hundred other matters, in addition to managing the workmen and getting goods made, was too much to expect of any one man. Perhaps they were right. However, that was the type of man that for generations was selected for foreman. Taking it by and large, he made a pronounced success of it. What he didn't know about his particular job could be easily written on his thumb nail. But he was not remotely a "composite man." As a rule he had a common school education of an indifferent sort, was not much of a reader, still less a writer. Bred to his work, promoted from the ranks, circumscribed by departmental environment and the military type of organization, if he did not become narrow, bigoted and rutty, it was not the fault of the circumstances that molded him.

Today in the study of manufacturing department problems, the foreman stands as No. 1. Going back to the beginning in a search for the high cost of production the foreman is found entrenched in his department about which he knows a great deal, in a factory about which he knows very little, and of whose processes he knows less. He is buried in detail, overworked, probably underpaid, but hugging fiercely the belief that all these things are part of his prerogatives, and to lose which will detract from his importance with his men and his standing in the organization. Planning department, job analysis, time study, industrial relations, welfare work, and a lot more, are terms that fill him with suspicion and rage: "Somebody is after his job"

THE FOREMAN'S PROBLEM

Let us consider for a moment the foreman's point of view. Does he seek a change? Does he wish his responsibilities curtailed? Is he clamoring for larger opportunity? As long as he is reasonably well paid, is it not a fact that he is satisfied with his job, and would prefer to be let alone? That he resents interference, and finds it hard work to believe in the good intentions of those who would change the old order of things? The four walls that enclose his department are his world, and in thousands of cases where he has spent long years as foreman, it is his very life. All his hopes, ambitions and interests are bound up in it. He can conceive of no existence away from it, and many are the instances where, retired on pension or laid off for cause, he loses ambition, perspective and morale, goes permanently into the discard and dies of a broken heart.

Face to face with new demands, what is the employer to do? "Let the foreman alone," declares one, "he knows more about his job than any one in the plant. If he leaves or dies, it will be hard to replace him." "Educate the foreman," recommends an exponent of modern methods.

Surely too many foremen know little about the manufacturing end of the business with which they are identified. The ranks are filled with men who know next to nothing of processes outside their own departments. This is not sufficient now. A foreman, be his value to the organization what it may, does not and never can represent a 100 per cent value until he knows all the production steps necessary in the manufacturing scheme in which he is a factor.

We hear a great deal these days about the foreman as a "manager," "supervisor," and the demand is for "cooperation with the management." We make a chart of our foreman, and make a serious attempt to classify him psychologically as to: appearance and manner, special knowledge, initiative, judgment, ability in developing men, thoroughness, cooperativeness, tact, fight or push, health, loyalty and honesty, and as many more as may suggest themselves, depending on how badly we have been stung by the new efficiency bug. We note the color of his hair and eyes, his facial angle, the tones of his voice, the shape of his hands, the expression of his face and eyes, his mannerisms, his gait and carriage. It looks as though we were searching for a super man,—and hoping we wouldn't find him.

However, the fact to be considered is this: You cannot expect cooperation in any real sense from a foreman whose knowledge concerning the product made by the concern that employs him is confined wholly to that part of the process found in his department. His interest is proportioned to his knowledge. His range is circumscribed, his outlook narrow and provincial. From his place in the well of his environment he cannot possibly see but a modicum of blue sky.

A VALUABLE MAN

The average foreman is a valuable man. A good deal more so than the average management is willing to admit—except privately. He has at least two notably conspicuous qualifications: thorough knowledge of his branch of the work, and natural ability to control men. About such a man swings the complicated mechanism of departmental production day in and day out. No one with factory experience will deny it to be a trying position, not easily attained, and difficult to hold.

If, however, changed conditions, more complicated problems in management, more intensive competition demand a different type of man for foreman, what are you going to do with the old line men? Are you sure that a different type is necessary? Isn't the "composite man" more or less of a pipe dream? If so, what acid test can be applied to foremen now in command, that will prove their intrinsic value? With factory problems, as in religious beliefs, the most of us accept the easiest way, letting well enough alone, and contemplating ourselves with huge complacency. We refuse to think, for active, constructive thought leads to critical analysis which is almost sure to bring our castles tumbling about our ears. The bogey that finally awakens us from our self-hypnotized condition is *competition*. We note with consternation that the other fellow—who woke up some time previously—is underselling us and is apparently getting away with it. Investigation of our own problems shows that our costs are too high, and we are haunted by a persistent and pestiferous "Why?" Departmental maintenance, routing, costs per man hour, labor paid for by the hour that should be paid for on a production basis, lack of coordination, lack of the cooperative spirit,

are some of the causes responsible for high costs. We look for the "goat," and to our astonishment we find, perhaps, that there are two: the factory management, and the foreman. Like the man in the crowded street car, we have to step somewhere, so we step on the foreman.

DEVELOP THE OLD LINE FOREMAN

There is a factory proverb that states a patent truth: a workman is no better than his foreman. As it is a poor rule that doesn't work both ways, it is equally true that a foreman is no better than the factory management. However, as it is equally apparent that improvement must begin at the top—the management having already passed through that mysterious process known as a change of heart—improvement in the quality of foremanship becomes the slogan. There are several ways of doing this. To discharge the incompetent, or educate the old liners, and to develop understudies.

It is not good ethics or good business to demote the old line foreman without first giving him an opportunity to show what margin for development he may possess. Some of these men are "live wires." On the other hand, in my experience in training and developing foremen, it is interesting and instructive to observe that the response to what may be fairly called an opportunity, is far from unanimous. No one should expect it to be. There is many a foreman who thinks he knows more about his job than the superintendent, and as a matter of fact, he ought to. But there are also many who, obsessed by the "know it all" delusion, have no vision and fail to see the signs of the times. There are always some "from Missouri," and a few, not necessarily the younger men or women, who are eager to improve opportunity for enhancing their value to the concern that employs them; and a few that temperamentally are not content to let well enough alone or drift with the tide.

THE NECESSARY KNOWLEDGE AND ATTAINMENT

In proceeding to improve the quality of foremanship I wish to point out that there is a tendency to overdo the so-called educational features sometimes embraced in the coined term "highbrow stuff." If there is any one thing that bores the average foreman to extinction, it is that line of talk or reading that deals with theory rather than practice; with ethics rather than economics. All his life he has had to face actualities, therefore any scheme of development to appeal to the old line foreman must hit him in a vulnerable spot. In larger organizations foremen rarely know much outside their departments, excepting possibly those operations in intimate sequence with their part of a manufacturing process. Formerly it has been the distinct policy of the management to confine the activities of foremen to their own departments. The onerous responsibilities of a foreman demand so much time and thought that he is unable to study the work of other departments. Nothing but an edict of the management can change this situation.

The problem, therefore, is revealed in the following basic declaration: A foreman should know every step through which raw material passes to become a completed article, whether it is a steam boiler, a machine, a shoe, a fabric, a rubber tire, or any other article that is dependent on successive, correlated steps for its production. This knowledge can be acquired in two ways: first, by doing the actual work; second, through the medium of analytical study of each step in process. As to the first, knowledge of the manufacture of anything gained by personal experience requires a lot of time. It is a wonderful way, and some say the only right way, particularly if coupled with written, analytical study. It is the ideal method for developing an understudy for foremanship. But a foreman already installed and operating a department could not be spared from his duties long enough to work through each factory process. He can, however, avail himself of the analytical method.

As a preparation for this the foreman should read about the crude materials used in his particular line of manufacture, as for example: iron, cotton, copper, rubber, silk, chemicals, and so on. Having done this he should clinch the information in his mind by setting it down in writing as thoroughly as he is able. He is then ready for the study of the processes through which the crude material must pass in becoming a finished article.

The study of manufacturing processes is better taken up successively, and as time is valuable, a competent instructor will greatly assist the investigator in concentrating the student's attention on essential points. A guide should therefore be supplied in the form of the following questionnaire:

FOREMAN'S QUESTIONNAIRE

1. Describe in detail with floor plan, the ———— department.
2. Give particulars of: (a) Lighting; (b) Heating; (c) Ventilation; (d) Power; (e) Safety appliances.
3. Material used, where and how obtained.
4. Is supply continuous? If subject to delays give cause and suggest remedies. Make a graph showing trip through this department, and if backward steps are disclosed give the reason, and criticize with suggestions for improvement.
5. Personnel: Consider each individual on the job, how his work is done, skill or its lack, adaptability, method of instructing learners.
6. Give a description of the machines used that will show you have an intelligent comprehension of them. Expand this under the following headings: (a) Location; (b) Floor space; (c) Power; (d) R. P. M.; (e) Gears; (f) Safety devices; (g) Special appliances; (h) Accessories; (i) Light; (j) Production.
7. Give detailed account of the operation of each machine, expanded under the following headings: (a) Delivery of material; (b) Getting machine ready for operation, cleaning, oiling, changing parts, if necessary; time involved for each step; (c) Detail of operation; (d) Operator's special precautions; (e) Foreman's supervisory points.
8. Capacity per hour: (a) Maximum on basis of machine speeds; (b) Actual average as shown by records; (c) Note difference between maximum and average, and undertake to account for losses under the head of Interference.
9. Interference, as caused by: (a) Condition, type, age, etc., of machine; (b) Poor delivery of material; (c) Location, light, heat or ventilation; (d) Poor service of operator; (e) Inefficient supervision by foreman.
10. Make recommendations to overcome these conditions, and show to what degree, approximately, production can be increased.

This type of questionnaire, elaborated or curtailed to suit, can be adapted to all factory operations. Vitally essential is a study of material routing from one process to another, accompanied by a graph to visualize the routes. It is a method that immediately indicates where improvements can be made to cut out lost motion, and readjust steps in sequence. Possibly the most valuable feature of this branch of analytical work is forcing the student to think. Criticism, pure and simple, arrives nowhere. To be of value criticism must be constructive. The ability to tear to pieces must be supplemented by the ability to reconstruct, rearrange, improve, modify, all to the end of securing greater efficiency. These things are manifestly impossible without concentrated, constructive thought. The foreman's job is a thinker's job.

FOREMEN MUST BE LEADERS

Analytical study as above outlined will result in a terrific shaking up of any group of foremen with the sure result of bringing the really capable men to the top. It is also obvious that the foreman will make some discoveries about himself causing surprise, pleasure, or chagrin as the case may be. He is almost sure to find among other things that he is not nearly as smart as he thought himself to be; that in his line of work to which he had devoted years, in fact, in his own department, data will be found that he never dreamed existed.

If the foreman is of the right stuff, if he has not become a

victim of mental atrophy, he will immediately discover that he fills a more important position than he supposed. That, if the new method removes certain functions that he had always regarded as privileges, at the same time it substitutes others of greater importance to be absorbed as part of his personal equipment. He discovers that he must be a leader, which is a lot more than being merely a "boss," and that leadership must enlist initiative, tact, judgment, decision, as well as knowledge and force, to maintain a proper standard.

He finds that as supervisor and manager he fills two distinct rôles, in one of which he deals with raw stock, equipment and processes, and in the other with economies, standards, costs, reports and production control. He finds himself in a new relationship to the whole organization—that of cooperator. He now knows how the goods are made, why they are made, and the underlying principles that result in their production. He now for the first time understands all these things and the knowledge fills him with a tremendous ambition to be an active factor in the organization as a whole. The charts that follow will illustrate the responsibilities of the modern foreman.

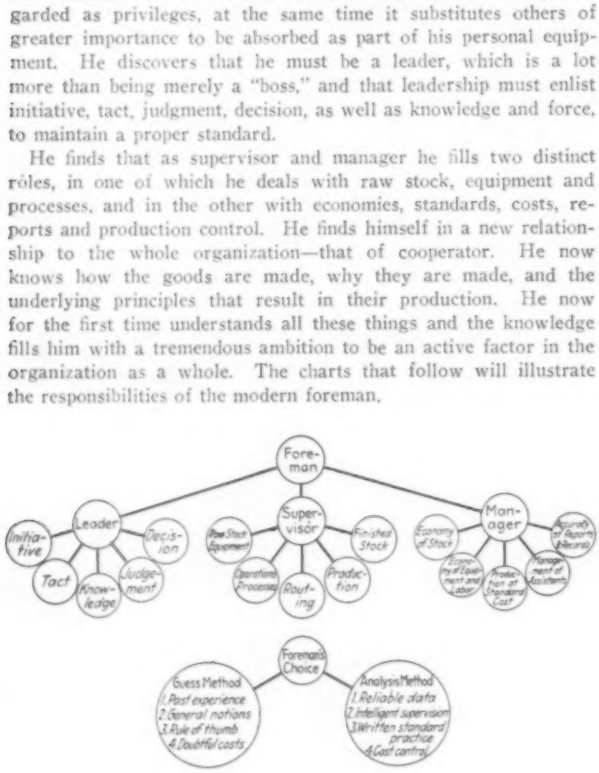


CHART SHOWING THE MANIFOLD DUTIES OF A FOREMAN

Taking the average run of factory departments, it is safe to say that they do not exceed 50 per cent efficiency on the basis of possible productive capacity. Analytical study of each step in the manufacture of any article will bring this fact home to the factory manager. In many cases such poor showing can be charged directly to the corporation that has failed to provide proper equipment and working conditions. But in the majority of cases the foreman comes in for just criticism because, having equipment and opportunity he has lost sight of the fact that to be a successful foreman he must use his brains every moment and be his own most unsparing critic. Instead, however, he deliberately chooses the easiest way, tries to hide himself behind the excuse, "We have always done it that way." It is so easy to run along in the old ruts and those who choose this path deliberately cultivate failure for themselves and the organization.

TIME STUDY AND RATE SETTING

As the foreman proceeds with analytical study he will discover the necessity of a working knowledge of time study and rate setting. He is probably accustomed to the presence of a member of the cost department making studies of his work, followed by piecework rates that he is expected to approve. He has, likely as not, held the whole tribe of time study men in more or less contempt, regarding his own rule of thumb knowledge of all jobs as a better criterion for making a piecework rate than all the stop-watches and time studies that could be introduced. As to the method itself he is ignorant. He knows nothing of the painstaking effort, patience, critical analysis, judgment, and knowledge that this work demands in order to be properly done. He has, fortunately, advanced to a point where there suddenly dawns on his vision one of the practical advantages of the studies he has been making. Understanding analysis, why not master the mysteries of time study?

He finds it no very difficult matter after all to learn to manipulate and read a stop-watch, enter times and notations on the printed forms, assemble the results, and make a piecework rate himself. Having acquired the method he is then for the first time in a position to sit in judgment on rates for piecework submitted by the cost or the planning department.

The old line foreman has by this time become, in many respects, a different person. He has, at last, a real understanding of the whole process and procedure of manufacture in general and in particular, the strategic value of the position he holds. If he was interested and loyal before, he is doubly so now. He finds that he is much more than a cog in the great wheel; he is now a part of the motive force that turns it.

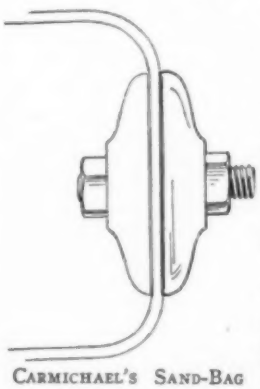
FOREMEN UNDERSTUDIES

He has, however, one more object to attain before he can really consider himself fairly on the way to advancement. He must set himself to the no inconsiderable task of developing an understudy. He must absolutely cast out the subconscious fear that has stood at his elbow through all the long years; the fear that some time, somehow, some one would get his job away from him. If he now regards himself with redoubled complacency on account of his new accomplishments, and has a "hunch" that he could fill a position higher up, a little reflection will convince him that he could by no possible chance be selected for promotion unless he had a man ready to step into his shoes. Hence the indispensable value of an understudy.

It is a common and humiliating experience of the management to be balked by the shortage of promotion material within the organization. Lack of foresight, false economy, is no doubt responsible for such a condition. In the old days, under the old methods, foremen could hardly be blamed for not "loosening up" on their particular methods, developed by themselves, whereby their departments had made a record for success, but now, if the foreman lacks the vision to see the advantages to himself of an understudy, then the management should insist upon it.

In short, management is now face to face with a problem of no mean dimensions, that of providing men to take the places of the old line foremen, as from time to time they are promoted or retire from active participation in business. It is not too much to say that on the successful selection and training of such men depends in large degree future success; the ability to lead and survive in the intensive competitive struggle now on in this and other countries. Of late, in all parts of the United States, the developing of foremen is receiving the attention it demands, and it may be found, after all, that a "composite man," trained as a specialist, is the answer.

CLOSING ENDS OF SAND-BAGS



CARMICHAEL'S SAND-BAG CLOSURE

A unique and original method of closing the ends of sand-bags for tire repair work has been devised by a New Jersey repairman.

The method is shown in the illustration and comprises the use of two cast-iron washers between which either end of the bag is securely held by compression exerted by a connecting bolt and nut.

This method enables the repairman to positively prevent all porous places at the end of the cures, and gives a definite point at which to start and end in making the first cure—which is a matter of distinct merit and advantage.

Design and Construction of a Five-Inch Straight-Side Cord Tire

By Burton W. Morrison

THE two main points in tire manufacturing are the supervision of all processes involved and designing the equipment. Supervision is the greater factor due to the numerous materials used, and to the numerous operations required in making a tire, where a slight mistake would cause a defect in the finished product.

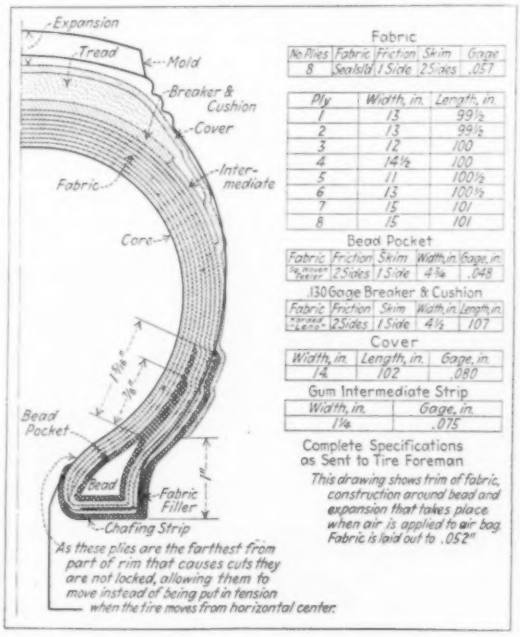
The design of equipment should be supervised by competent tire designers as a mistake in this direction might, and generally does mean a cost of thousands of dollars, due to the fact that it is not discovered until the tires come back for adjustment, and by that time many tires having the same fault are on the market.

Following is a brief outline giving the main points in the design and construction of a five-inch air-bag cord tire.

TREAD

A stock making a fadeless jet-black tire is very suitable and should be compounded to be tough and pliable, allowing it to flow easily into the voids of the mold when under pressure. There are three methods of making treads; tubing, calendering, and hand building. Tubing is the method generally used, as with interchangeable dies, a tread of any shape can be made from one machine. These dies are heated by means of a cartridge heater placed in the head of the machine.

As the tread leaves the tubing machine it runs onto an inclined roller conveyor, is cut to desired length and placed into books

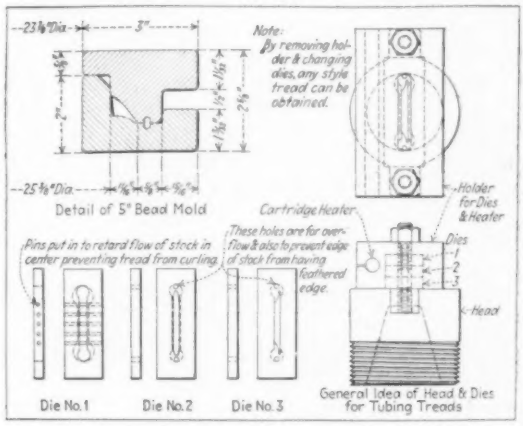


SPECIFICATIONS FOR A FIVE-INCH STRAIGHT-SIDE CORD TIRE

which when filled are taken to the inspector who cuts them to bring the tread to the required weight. The tread is next sent to the assembling department to be distributed to the tire builders.

FABRIC

The fabric can be either 15.1-ounce S. A. K., Egyptian, or American three-pick cord, depending upon the quality of the tire desired. The fabric should be frictioned on one side and skim-coated on two sides, so that the total gage will be .052-inch, a gage which should be kept as uniform as possible. In frictioning stock on a calender, a skim coat must first be applied to keep the cords from distorting due to the action of the upper roll going faster than the stock, which is the procedure when friction-



DETAIL OF BEAD MOLD—DETAILS OF HEAD AND DIES FOR TUBING TREADS

ing. The final skim coat should be of a sufficient thickness to bring the gage of the stock to .052-inch.

To eliminate frictioning some concerns run their stock through a solution and then over a drier. Although by this method the stock is thoroughly impregnated and gives better results than frictioned stock, it is not generally used on account of the slowness, cost, and the danger of fire, due to the naphtha fumes and static electricity.

BEADS

The bead is one of the most important parts of a tire and is the cause of many adjustments. The general method of bead making is as follows:

On a drum is laid a piece of "jeans" 2½ inches wide, which has been frictioned on two sides and skim-coated on one, to a total gage of .035-inch. A small piece of square-woven fabric frictioned on both sides is next placed on the jeans, at any point, to act as a lock for the wire. Five piles of standard, 17-strand, 21-gage braided wire, with the crevices filled with gum by running the wire through a tubing machine, are next placed on the wheel, taking great care to get the wire on with a strong and uniform tension.

The wire is next cut off and locked into place and a piece of bead cord filler ½-inch wide skimmed on one side is placed over the wire to give the bead a flexible top. The wire and filler are then enclosed by the jeans and the bead rolled firmly down. The bead is next placed in the mold and cured and on being removed it is trimmed, buffed and then dipped into a solution of cement, and when dried it is ready to be placed in the tire.

MOLD

Knowing the materials to be used in the tire, it is possible to design the core, mold and bull ring. The fabric should be figured to compress to .042-inch from .052-inch, a figure compiled from data obtained from experiments, using an air-bag with an internal air pressure of 150 pounds.

The width of the mold should be such as to allow as great a cross-sectional area as possible, but not wide enough to cause the fabric, running from the top of the bead up towards the

center of the tire, to have a double curve. This fabric should be as straight as possible to prevent rim cuts and fabric rupture above the bead. A mold made 5¼ inches wide, allows the fabric to lie very straight, and gives the tire a cross-sectional area large enough to withstand any load.

The next distance determined is the inside diameter at the bead, which is governed by the standard rim on which it fits. For a 35 by 5-inch tire, this dimension would be 25-3/64 inches or 3/64-inch greater than the diameter of the rim. Making the tolerance between the bead and the rim greater than 3/64-inch is dangerous on account of the liability of there being a buckle in the bead wire, which when put under pressure will straighten out, causing the tire to leave the rim.

The width of the tire at the bead should be 3⅛ inches, the same as the rim.

With the inside diameter known, the next step is to determine the location of the center. This is done by laying out the cured tire around the bead with trim and construction as shown in the illustration and taking a radius of 2.209 inches—a figure compiled by taking the thickness of eight plies of compressed fabric, .336 inches, and an .080-inch gage cover, from half of the thickness of the mold, 2⅝ inches—and swinging it from the perpendicular center line of the mold until it forms a tangent to the fabric around the bead.

If the preliminary layouts are made four-times size, this dimension can be measured accurately; otherwise, it will have to be figured. As it is required to have the inside of the tire a circle, this dimension can be obtained by adding 4.418 inches to the diameter of the center. The main dimension then left to be determined on the mold is the total height.

The tread of a tire is usually figured to wear approximately .04-inch for each thousand miles, and if non-skid is designed so that voids are not over 20 per cent, the total thickness of the rubber over the breaker will be 10 x .04 x 1.20=.48. By adding together the thickness of the tread, .48-inch, eight plies of fabric, .336-inch, and the thickness of the cushion breaker, .130-inch, the total thickness of the stock at the top of the tire will be .946-inch and with this known the height of tire can be determined.

In the design of an air-bag cord tire the tread must be made continuous, that is, there must not be any knobs which are not in some way connected to the center bar of the tread, allowing an outlet for air. If this is not done each stud or knob must be ventilated, otherwise air blisters will be formed, which, although not detrimental to the life of the tire, spoil the appearance, causing the tire to be sold as a second, or necessitating repairing. The fact that an air-bag is used to put the fabric in tension has allowed cord tires to be designed with the tread that presents a very nearly flat surface to the road. This flat tread, which is impractical on full-molded tires, presents a broad surface to the road, resisting skidding, and under a load avoids cuts and bruises, due to the fact that the tread stock is under compression.

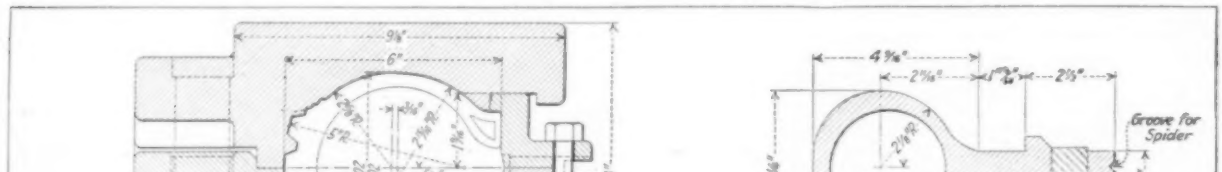
Tread design should not be so complicated as to make machining difficult, and should involve both a suction and knob as a non-skid feature, although it is possible to make non-skid so effective that the carcass of a tire will not be able to stand up under the continuous strain caused by resisting the skid. On account of this fact many treads are designed with very little non-skid qualities.

With the foregoing data, the mold can readily be laid out, care being taken to have the body heavy enough to withstand hydraulic pressure and to prevent springing when being machined, and made so that the male and female halves can be readily separated.

CORE

As it is impossible to put cord fabric in tension when building, cores are designed so that they are 3 per cent smaller in circumference than that of the inside of the finished tire. This allows a peripheral expansion of stock of 3 per cent. As the fabric is locked around the bead and the bead being of wire cannot change circumference, the cords are put into tension when air is applied in the air-bag.

Air-bags made of rubber are generally employed, as they are not only cheaper but more practical due to the fact that their expansion is not limited, and they will fill out a tire no matter if the stocks are a little light. A fabric air-bag is made the same size as the finished tire and then crowded into a tire made on a core 3 per cent smaller in circumference. In doing this the bag is liable to become wrinkled which results in ruining the air-bag and spoiling the tire.



MOLD SECTION CORE SECTION

MOLD AND TIRE BUILDING CORE FOR A 35 BY 5-INCH STRAIGHT-SIDE CORD TIRE

In designing the core there are really only two dimensions of importance, the width and the outside diameter. The outside diameter is found by finding the circumference, which is 3 per cent less than that of the inside of the finished tire. The width in this case is 4¼ inches, a figure obtained by subtracting twice the thickness of the plies of green fabric, .416-inch, and .080-inch gage cover from the total width of the mold. The remaining dimensions on the core are determined by building equipment.

The core is made in four sections which are held in position by either a double ring fastened together through the sections of the core by bolts, or by means of a single tapered ring hammered into slots provided in the core.

TIRE MAKING

As a rule cord tires are built by hand due to the fact that each ply is put on with the cords running at right angles to the preceding one. This method of laying plies makes it very difficult to manufacture cord tires by machine, due to the uncertainty of tension devices. In hand making, tire materials are

usually all placed in one book, with the first two plies on top, and the cover on the bottom, and the book placed on a stand in a convenient position for the tire maker. Two plies of fabric are usually rolled together with the cords at right angles to each other, and placed on the tire as one unit.

The following, in the order named, are the operations in making a tire:

1. Cementing the core.
2. Applying first and second plies.
3. Trimming first and second plies.
4. Placing the fabric for the bead pocket.
5. Placing the beads by means of bead-setting rings.
6. Turning the fabric for the bead pocket up over the bead.
7. Applying the third ply and trimming it.
8. Applying the fourth ply and trimming it.
9. Placing filler and chafing strips, and turning the chafing strips around the beads.
10. Applying the breaker.
11. Applying intermediate strips to take the shock not absorbed by the breaker.
12. Applying the tread, rolling down, and removing air blisters.
13. Applying the cover which is of the same stock as the tread, and put on to prevent dirt and soapstone from getting into crevices of the tread and prevent curing.

The cover is trimmed and the tire and core are sent to the stripping table, where the core is removed and reassembled ready to be again cemented. The tire is next dusted on the outside with soapstone, and the air-bag, painted with soapstone solution to prevent it from curing to the fabric, is inserted. After the bull rings have been placed on the tire it is put into the mold and placed in the cold press, which presses the halves together, enabling them to be fastened by means of wedges or tee-bolts.

A pressure of from 135 to 150 pounds is applied to the tires, which are then put into the vulcanizers to be cured. After the tires have been in the heaters the required time, usually about two hours and a half, the vulcanizers are flooded, so as to give a uniform cure, and the tires removed after the air-bag has been deflated.

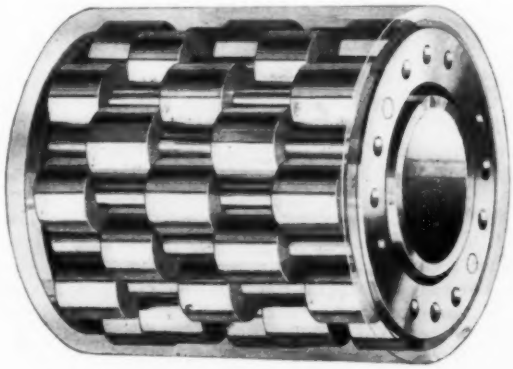
The tires are then inspected, cleaned, painted, flaps inserted, and wrapped ready for the market.

Roller and Ball Bearings for Rubber Machinery

PRODUCTION is materially increased by the use of correctly designed and accurately made ball and roller bearings, in transmissions, motors, pulverizers, masticators, mixers, calenders and other rubber machines where heavy work and continuous operation are necessary. Tests have shown a power saving over plain bearings as high as 50 per cent, but this is exceptional. Ordinarily 15 to 25 per cent is more nearly correct. By using bearings particularly adapted to the machines, not only is there a saving in power, but almost continuous operation is insured, and the annoyance of shut-downs to reline, adjust or replace plain bearings is avoided.

ORDINARY BEARINGS WEAR QUICKLY

It is a well-known fact that workmen rarely give proper attention to the lubrication of plain bearings, and in consequence friction develops, the bearings wear out quickly and require renewal just when the mill is busy. A properly designed ball or roller bearing, packed with correct lubricant and properly enclosed, will operate at least fifty times longer than a plain bronze or babbitted bearing under the same conditions and effect a large saving in lubricant. Frequently too little attention is given to mounting and enclosing bearings. They can be so enclosed as to retain the lubricant almost indefinitely and prevent leakage of oil to the floor or the material being manufactured. Manufacturers of ball and roller bearings specify the lubricant which will give the best results. Graphite and other pulverized minerals should be avoided as well as greases or oils containing any acid or alkali. Pure vaseline thinned with a pure mineral oil to the consistency of cream makes the best lubricant.



HART STAGGERED ROLLER BEARING

GREATER LOAD CAPACITY

It is readily seen that the load capacity and speed of operation of ball and roller bearings exceeds that of plain, bronze or babbitted bearings, and also if properly designed they require no adjustment and can be made fool-proof. The ball and roller bearing has each its particular field, although a correctly designed roller bearing is generally superior to a ball bearing for load carrying. A ball bearing, because of inherent features of design, is usually better suited to relatively light loads at high speeds; on the other hand a roller bearing is superior for heavy loads at moderate speeds, and will more successfully carry heavy shock loads.

BALL AND ROLLER BEARINGS COMPARED

Comparing a ball of certain diameter and a roller of the same diameter with length equal to the diameter, the roller, for a given load, will have a greater surface contact with its raceway than the ball. The direct compressive stress over this area of contact therefore will be smaller for the roller than the ball. Hence the roller will safely carry a greater load than the ball at all speeds, since the drop in capacity at different speeds, due to fatigue stresses, is approximately the same for each. Size for size, made of the same material, and operating at the same speed, the roller bearing for a stated safe working stress will carry approximately 50 per cent greater load than the ball bearing.

THE QUESTION OF BALL CONTACT

As the ball makes contact with its raceway under load, a certain area at the top and bottom of the ball, differing slightly in magnitude, will be in compression. The form of this surface contact area will be a warped ellipse. As a result, instead of having point contact, surface contact occurs, and a series of points on each side of the highest point of the ball will be touching the raceway. Since the ball should theoretically rotate about its own axis, and since the speed of rotation of a point on the periphery of the ball varies as the distance from an axis through the center of the ball, it follows that for any load applied to the

bearing there will be a certain amount of slippage as the load on the ball is increased. It follows that the contact area becomes greater, thus increasing the slipping tendency. There results a sliding effect on the raceway which slowly grinds it away. Ball bearings are thus limited in load-carrying capacity by practical as well as theoretical considerations. Slippage is not met with in correctly designed roller bearings. All points on the periphery of the roll necessarily have the same velocity at any given rotation of the bearing.

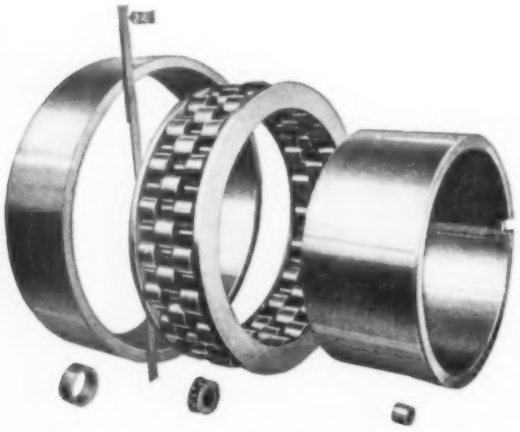
Many ball bearings are designed to carry both radial and thrust loads simultaneously, by employing angular contact between balls and races. Since it is a practical impossibility to design a ball bearing so that the velocity of each point of contact will be the same, an additional spinning action is introduced. This tendency, together with the slippage, causes two distinct spinning effects on the raceway. For any appreciable radial and thrust load the wear and tear on the raceways is of serious import. A bearing should be designed for the performance of only one function at a time.

TRUE ROLLING MOTION DESIRED

In any ball or roller bearing true rolling motion—revolution of balls or rollers around their axes in parallel planes—is desired. This means freedom from slippage, and skewing, and elimination of wear. Properly designed and accurately made roller bearings fulfill these requirements.

In roller bearings made of a series of rolls the full length of the bearing, it is practically impossible to grind the rollers so that they are true cylinders. Hence it is almost impossible in long rollers to eliminate warp due to internal stresses from heat treatment and subsequent finish grinding. Other things being equal, the roller warp will be proportional to the ratio of the length to the diameter of the roller. If the length and diameter of the roller are equal there is no warp.

The warp of long rollers produces misalinement, the load frequently causing them to skew and weave about the inner race.



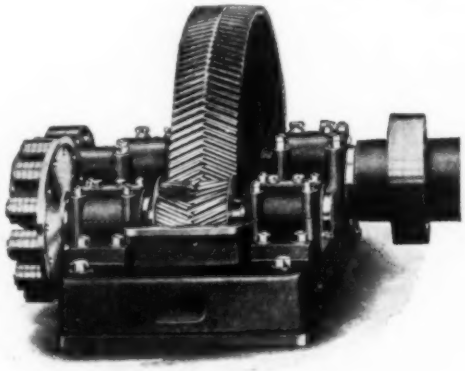
LARGE BEARING, 21½ INCHES DIAMETER, 75-TON CAPACITY; SMALL BEARING, 1-9/16 INCHES DIAMETER, 1,200 POUNDS CAPACITY

As a slight running clearance must be provided, this skewing tendency is thereby accentuated and often results in roller breakage.

ACCURACY IN DESIGN AND MANUFACTURE NECESSARY

In any roller bearing, under a static load, the rollers are subjected to surface compression, as well as bending stresses of varying intensity throughout their structure. Under dynamic load, the rollers are subjected to an additional fatigue stress, which directly affects the load-carrying capacity. This fatigue stress is a function of the speed of rotation of the raceway. For a given allowable resultant stress, therefore, the capacity of the bearing will decrease as the speed of rotation increases. The capacity of a bearing is also directly dependent upon the accuracy and finish of the units entering into its construction.

In the case of long continuous rollers the load practically never will be distributed uniformly over their entire length, but will be either localized or distributed over a limited portion of the roller



HART ROLLER BEARINGS APPLIED TO REDUCTION GEARS

length. Since warp usually occurs in long rollers, some parts will be stressed excessively, while others will not.

Unequal load distribution cannot be overcome by using flexible rollers because the end of the roller carrying the greater load will deflect more than the other or light-loaded end. In consequence such rollers become conical and will not roll in a path with axis parallel to that of the axis of the shaft on which the bearing is mounted and the rollers will creep and wear into their retainers.

ADVANTAGES OF STAGGERED ROLLS

The roller bearing in the illustration represents a distinct departure from conventional roller bearing design, because it employs staggered rolls, which efficiently carry large radial loads. These rolls are made of steel, high in carbon and chromium, hardened and ground, and operate between two raceways of the same material. The rolls are mounted axially on steel cage-pins, riveted to steel-end retaining rings. The pins, rings and rolls constitute the roll assembly which operates between the raceways, ground to very close tolerances.

In staggered roll construction, with proper roll diameter tolerances, the raceway distributes itself proportionally to each short roll, presenting a multiplicity of raceway supports. Each roll is thus able to adjust itself to that portion of the raceway which contains it. The result is maximum utilization of roll length, incident to full-line contact on each roll in the load zone. The spaces or pockets between the staggered rolls serve as oil reservoirs, feeding the lubricant zigzag to the periphery of the rolls, and all contact surfaces are thoroughly and automatically lubricated.

EXCISE TAX LAW REGARDING TIRES

Many tire dealers are unfamiliar with the war tax on tires and have sometimes added a tax to the price of the tire which is entirely unjustifiable. Taxes on tires, inner tubes, parts and accessories are, in all cases, paid at the source, or by the manufacturer, with certain limitations, as in the case of the sales agent or sales agency, where the manufacturer retains an interest in the profits from the resale of the article. As a general proposition, the tire dealer may forget about the excise tax so far as the sale of tires by him is concerned.

Present Position of the Plantation Rubber Industry[1]

THROUGH the courtesy of a well-known crude rubber importing house, it is possible to present a general and statistical report on the plantation rubber industry, showing the position of the plantations during the present crisis and a reliable forecast of what is likely to happen to the estates during the next year, as a result of the present low price of rubber. The facts were gathered first hand in the Straits Settlements, Federated Malay States, Java, Sumatra and Ceylon during February, March, April and May, 1921. All available reports and articles were studied and many persons prominent in the industry were interviewed, including plantation and agency managers, planters' associations, chamber of commerce and government officials, Chinese and native planters and dealers.

LACK OF ORGANIZATION AND ACCURATE STATISTICS

"This experience," writes the investigator, "convinced me that there is a great lack of organization in the planting industry, and an entire absence of accurate statistics. Each particular association or government may or may not understand the position of its own estates, but it certainly does not understand the position of those lying outside its own sphere of influence. I did not meet a single man who had really studied the world's rubber position as against the position of his own district. Not one of the rubber-producing countries possesses an efficient statistical bureau, and not one of the officials in charge of the compilation of figures in these different countries ever pretends to issue a complete and accurate return. So far as production and stocks of rubber are concerned, the figures presented must, therefore, be mere estimates. I cannot guarantee their absolute accuracy, but they are as nearly correct as it is possible to arrive at."

ACREAGE PLANTED DECEMBER 31, 1920

	Acres
British Malaya	1,760,000
Dutch East Indies	875,000
Ceylon	410,000
South India	60,000
British North Borneo	51,000
French Indo-China	50,000
Burma	45,000
Other countries	70,000
Total	3,321,000

ACREAGE IN BEARING DECEMBER 31, 1920

	Acres
British Malaya	1,160,000
Dutch East Indies	537,000
Ceylon	310,000
South India	43,000
British North Borneo	35,000
French Indo-China	28,000
Burma	18,000
Other countries (Siam, Philippines, etc.)	32,000
Total	2,163,000

PRODUCTION FOR 1920

	Tons
British Malaya	169,100
Dutch East Indies	78,000
Ceylon	41,000
Other countries	21,000
Total	309,100

This represents an average production of 316 pounds per acre in bearing. The total is about 25,000 tons less than that given by Rickinson and Harrisons & Crosfield. The Federated Malay States figure is the all-important one. It was furnished by the secretary of the Planters' Association of Malaya in Kuala Lumpur and is at least approximately correct.

PRODUCTION IN 1921

The voluntary restriction came into effect on November 1, 1920, on the estimated output from that date. As this was confined to about 80 per cent of the members of the Rubber Growers' Association, whose total membership is 1,149,610 acres of planted rubber, of which about 900,000 acres are in bearing, it follows that the scheme applied to only about 650,000 acres of bearing rubber out of a total of 2,163,000 acres, or less than one-third.

Careful analysis of all available crop figures, covering at most only one-third of the acreage under cultivation, shows that in November, 1920, these estates started reducing their output. In December their output was 15 per cent less than in the corresponding month of 1919, and has since gradually decreased, until at the end of March, it was about 28 per cent less than in March, 1920.

In Malaya the production for the first quarter of 1921 was about 25 per cent less than for the corresponding period of 1920. The reduction in the Dutch East Indies was about 15 per cent, and in Ceylon about 10 per cent, or a total reduction of approximately 21 per cent, as shown by the following figures:

	First Quarter, 1920	First Quarter, 1921
British Malaya...*Tons*	42,400	31,800
Dutch East Indies	19,000	16,150
Ceylon	10,000	9,000
Other countries	5,200	4,000
Totals	76,600	60,950

"I am convinced," writes the investigator, "that the returns for the second quarter will show a further reduction of at least 10,000 tons, so that the output for the six months to June 30, 1921, will be approximately 110,000 tons, as against 154,000 tons for the corresponding period of 1920. Failing some great change in the position, either by increase in the price or some general and efficient restriction scheme, I do not think that the output for 1921 will exceed 200,000 tons, or approximately 65 per cent of the figure for 1920."

EXPORT

Rickinson gives the official total export of plantation rubber for 1920 as 304,816 tons. The following figures for the first quarter of 1921, as compared with the corresponding period of 1920, represent a reduction of approximately 30 per cent.

	First Quarter, 1920	First Quarter, 1921
British Malaya...*Tons*	56,980	32,478
Dutch East Indies	15,492	12,719
Ceylon (to 14th April)	10,230	12,840
Totals	82,702	58,037

STOCKS

The Planters' Association of Malaya has prepared the following estimate of rubber stocks at the end of 1920, which is as nearly accurate as possible:

In the East:		
Singapore	*tons*	25,000
Colombo		5,000
Dutch Indies		15,000
On the Estates		35,000
		80,000
In America:		
Held by dealers and manufacturers and in transit within the U. S. A.	*tons*	120,000
In London		50,000
In Japan, Canada, Australia and Europe		20,000
Afloat		40,000
Total, all stocks	*tons*	310,000

Taking into consideration the production and export figures presented above, and the increase in London stocks, the visible supply must have increased by a further 30,000 tons. In brief, there must be approximately 340,000 tons of rubber in the world at the present time.

[1] From private reports received by F. R. Henderson & Co., New York, N. Y., from its eastern correspondent, Henderson Brothers, Limited, Singapore, who sent a special representative into the field to ascertain conditions at first hand.

OWNERSHIP OF ESTATES

This is a matter of the very greatest importance at the present time, when so much depends on the need for organization and the financial ability to weather the present crisis.

BRITISH MALAYA

Estates over 100 acres in extent:	
Acreage in possession	2,091,535
Acreage planted up	1,247,806
Acreage producing	826,986
Estates under 100 acres in extent:	
Acreage planted	512,194
Acreage producing	333,014

	Planted	Producing
Totals (estates over 100 acres)	1,247,806	826,986
Totals (estates under 100 acres)	512,194	333,014
Total acres	1,760,000	1,160,000

1,021,000 ACRES OWNED BY EUROPEANS

	Acreage	Issued Capital
Members of the Rubber Growers' Association	660,728	£39,211,721
United States Rubber Co.	11,000	660,000
Owned by private and local companies, and by individuals (largely British) not members of the R. G. A.	349,272	20,956,320
Totals	1,021,000	£60,827,041

739,000 ACRES OWNED BY ASIATICS

	Acres
Estates of Chinese ownership	569,000
Estates of Malay ownership	150,000
Estates of Japanese ownership	20,000
Total	739,000

The Malay holdings are small estates under 15 acres in extent. Of the Japanese holdings perhaps 20,000 acres are planted. Figures as to the capital invested in the acreage owned by Asiatics are unobtainable, but it is assumed in the report that if European owned estates average £60 per acre to bring into bearing, the Asiatic owned properties, on account of inferior planting and equipment, will not average more than £40 to £45 per acre. This brings the total expenditure on these 739,000 acres to approximately £31,000,000. Adding this to the issued capital of the European-owned cities, the total capital invested in rubber plantations in British Malaya is £91,000,000.

DUTCH EAST INDIES

	Acres
Total acreage planted	875,000
Total acreage in bearing	537,000

There are very few estates of 100 acres, and less, except in Djambi. The ownership of the estates is as follows:

	*Acreage	Capital Invested
British (members of R. G. A.)	255,522	£15,447,004
American	67,000	3,500,000
Dutch, French, Belgian and Swiss	552,478	31,150,000
Totals	875,000	£50,097,004

CEYLON

Members of R. G. A.	141,544	£15,696,831
Private and locally owned	220,052	13,000,000
Native estates under 15 acres	48,404	2,000,000
Totals	410,000	£30,696,831

OTHER COUNTRIES

Members of R. G. A.	91,816	£7,088,561
All others	184,184	10,000,000
Totals	276,000	£17,088,561

SUMMARY

	Acreage	Capital Invested
Members of R. G. A.	1,149,610	£77,444,117
American	78,000	4,160,000
Private and local companies and individuals (not members of R. G. A.)	753,508	43,956,320
Dutch, French, Belgian, Swiss, etc.	552,478	31,150,000
Chinese, Japanese, Malays and Ceylonese	787,404	33,000,000
Totals	3,321,000	£189,710,437

CONTROL OF ESTATES

The organization of rubber estates at a time like the present is a matter of the greatest importance, and the report outlines the membership of the principal associations and their spheres of influence.

RUBBER GROWERS' ASSOCIATION

This body has a membership of 908, consisting of 573 companies, and 335 individuals, with branches in Malaya, Ceylon, and South India. It controls approximately one-third of the world's acreage (1,149,610) and a capital expenditure of almost £80,000,000.

For obvious reasons, the Rubber Growers' Association is far the most influential body connected with the plantation industry. Its committee includes representatives from practically all the big rubber houses in London, and its influence in government circles is much greater than that of all others combined.

By reason of its size, it can bring its influence to bear on a great many of the smaller associations, and it has representatives on all the local planters' associations in the different countries concerned.

DUTCH ASSOCIATION

The members of this body are the Dutch-owned estates in Sumatra and Java, but there are a great many locally owned companies in Java which are not affected by its decisions.

JAPANESE ASSOCIATION

This body controls the Japanese plantations in the East, and has usually worked along with the Rubber Growers' Association and the Dutch Association in important questions like restriction.

PLANTERS' ASSOCIATION OF MALAYA

This body has a membership of 574 estates, which control 700,000 acres of rubber in Malaya. The great part of this area is owned by members of the Rubber Growers' Association, so that its authority is very local. There are also associations in Java, Sumatra and Ceylon, of which the majority of the local estates are members, but they exist very largely to protect the local interests of the industry, and they have no real weight in determining the policy of the owners.

In any question of voluntary restriction, the only bodies which have any control over their members are the Rubber Growers' Association, the Dutch and the Japanese Association, and, at most, the acreage controlled by these three bodies does not exceed 1,600,000 acres, or just one-half of the total acreage of the world.

The estates outside the membership of these three bodies are under no control of any kind, and many of the members of the Rubber Growers' Association and the Dutch Association have not carried out their restriction promise. The majority of the planters are selfishly, without regard to the world's rubber position or the general good of the industry, seeking to gain what others lose.

THE CRUX OF THE SITUATION

The whole position is simply this: A combination of the Rubber Growers' Association, Dutch and Japanese Associations may, to a limited extent, control the output of at most half of the world's acreage, but it cannot compel its members to abide by its decisions. The real strength of these associations is in the influence which they exercise in the political world, in any question of government policy. In the eyes of their respective governments, these bodies represent the opinions of the plantations.

There is a tremendous lack of proper coordination. Malaya is divided internally by the interests of private ownership on the one hand, and the Rubber Growers' Association on the other. Ceylon is completely out of touch with Malaya and the Dutch East Indies, and each is trying to benefit at the expense of the other.

In the opinion of the investigator the only way to obtain a universal restriction fair to all would be for the British and Dutch Governments to insist on the establishment of proper statistical bureaus, and to compel every owner of rubber in these countries to furnish accurate returns.

PRESENT POSITION OF ESTATES

The report discusses each country separately because of widely varying conditions.

BRITISH MALAYA

British Malaya possesses more than half of the world's rubber acreage, and is by far the most important factor in the present crisis. At the same time, it is much the most complicated and must be considered in four groups.

R. G. A. CONTROLLED ESTATES

In this group, controlled by the Rubber Growers' Association, and comprising 660,728 acres, are to be found practically all of the strongest and best-known companies with acreage well planted, fully equipped and properly managed.

Since November, 1920, these estates have restricted their output by 25 per cent, and the present average output is not above 70 per cent of last year's production. Practically none has closed down altogether. Most of them possess considerable cash resources, either actual or future, in the shape of forward contracts, and with few exceptions can carry on until the end of the year, when, unless conditions improve, they will mostly be at the end of their resources. But they will be the last to stop work and the first to revive with better times. To discharge their trained European and native employes would be but a present saving that would entail an enormous future expense for recruiting coolies from Java, and they will consider this only as a last resort.

LOCALLY CONTROLLED AND PRIVATE ESTATES

The estates in this group are of all sorts, sizes and conditions. Of the 349,272 acres owned by local and private companies and individuals, about 100,000 acres will manage to carry on for a further six months. The owners of the remaining 250,000 acres have exhausted their resources, cannot raise further funds by mortgages or debentures, are unable to sell even at ridiculously low figures, and before another three months are gone must close down, discharge their labor and await future events. Some may manage to retain sufficient labor to keep estates clean, but by the end of the year very few will be producing rubber. Until quite recently, some of these estates, by capacity output and rigid economy, were still able to produce without loss, but the present market precludes any possibility of profitable output, and they cannot produce at a loss.

ASIATIC-CONTROLLED ESTATES

On the 739,000 acres owned by Asiatics no voluntary restriction could ever be successful. These estates are independent of any planters' association, and are worked exclusively for the good of the owner, as distinct from that of the industry.

Of the Chinese-owned estates, totaling 569,000 acres, few possess cash resources in the ordinary sense, and without profits cannot continue in operation. The bulk of Chinese rubber, which varies from the highest to the lowest grade, is heavily mortgaged, the interest is not forthcoming and foreclosures will follow if there is any hope of recovering the money. In brief, most Chinese plantations are bankrupt, and, unless conditions improve, most of this acreage will be out of cultivation within a few months.

MALAY OWNED ESTATES

The Malay-owned rubber from estates totaling 150,000 acres is of very poor quality and badly cultivated, but the cost of production is little besides the labor of the planter himself, his family and friends. However low the return, the mere fact of earning a livelihood will prevent natives from abandoning their holdings, but many owners have found other means of earning a living and the acreage being tapped is decreasing monthly.

While it is impossible to prophesy, it is estimated that with present prices there will be a monthly fall in production until by the end of the year the output will be about 40 to 50 per cent of normal. A rise of even 2 pence a pound, however, would make a great difference to many estates, and Asiatic owners especially will recommence tapping as soon as there is a profit.

DUTCH EAST INDIES

There are 576 rubber estates in the Dutch East Indies, of which 161 are situated on the East Coast of Sumatra, 351 in Java, and 64 in the other islands of the Archipelago.

On the East Coast of Sumatra the estates are almost entirely first-class and are controlled by properly financed companies. Although they are faced with a higher cost of production than any other country in the East, they are very unlikely to experience acute distress until the end of this year.

Here, as in Malaya, coolies are imported from Java, and recruiting expenses are very heavy. This factor has prevented many estates from closing down, but the investigator found very few signs of distress or any disposition to close down, even though the great majority of the estates were producing at a loss.

In Java the cost of production is very low, and there are a great many estates which are producing to capacity, with correspondingly cheap costs. There is only a small reduction in output in Java, and with rubber selling at 9 pense a pound, f. o. b. Batavia, there will be little distress. Any fall below this figure will have serious results, but labor is so plentiful that it will be comparatively simple for the estates to close down temporarily, and resume work whenever conditions become favorable.

CEYLON

The crisis has produced very little hardship on Ceylon rubber estates. This is almost solely due to the big fall in the value of the rupee, and the resulting cheap labor. It is not at all uncommon to produce rubber f. o. b. Colombo as low as 5 and 6 pence a pound, and the average is little over 7½ pence a pound. This means that until recently most of the estates were still avoiding an actual loss on the crop, and consequently there was practically no restriction or closing down except among the members of the Rubber Growers' Association, whose acreage is only 141,000 acres, out of a total of 410,000.

Apart from the estates which are members of the Rubber Growers' Association, there is very little cash reserve to withstand any strain, but the cheap cost of production will enable Ceylon to carry on much longer than the corresponding class of estates in Malaya.

OTHER COUNTRIES

Of the total acreage of 270,000 acres planted, probably 100,000 at most are able to stand any strain over the next six months. The remainder have no resources, and will close down gradually, unless prices improve.

SUMMARY

Collating the figures from the above countries, the following is the approximate position at the present time:

	Total Acreage	Still Solvent	In Distress
British Malaya ..... *acres*	1,760,000	1,100,000	660,000
Dutch East Indies	875,000	750,000	125,000
Ceylon	410,000	350,000	60,000
Other countries	276,000	150,000	126,000
Totals ..... *acres*	3,321,000	2,350,000	971,000

If no improvement takes place by the end of the year, the figures will be much more desperate. Probably not more than 1,500,000 acres will have any resources, and the greater number of these estates will be on their last legs. The majority will be members of the big groups and of the Rubber Growers' Association.

VALUE OF ESTATES

Estate values are depreciating rapidly. While most owners would willingly sell, there are practically no buyers and the prices offered so low that continued ownership is preferred in the hope of a future recovery. All new development schemes have been abandoned, notably those in Borneo and Sumatra.

RESTRICTION

"Voluntary restriction," writes the investigator, "has been an absolute failure. In my opinion, the only remedy which would meet the position is compulsory restriction by means of export licenses, and, to make this a success, the assistance of all the governments concerned is essential. Financial assistance would also be necessary."

IN GENERAL

Until the present stocks of rubber are reduced to a reasonable economic figure, the hope of any substantial improvement in selling prices is most remote. Everything points to a production in 1921 of approximately 200,000 tons. What it will be in 1922 cannot be even guessed. The potential production in future years is as follows:

	Acres In Bearing	Output
1922	2,400,000	355,000 tons
1923	2,700,000	400,000 tons
1924	3,000,000	445,000 tons
1925	3,300,000	490,000 tons
1926	3,321,000	500,000 tons

The area of planted rubber which will disappear as a result of the crisis depends entirely on the future price of the commodity and the demand of the consumer. Three or four years must elapse before an abandoned estate will be valueless, and there seems to be no likelihood of any estates being destroyed deliberately or diverted to some other cultivation. In other words, the potential production of rubber remains almost unchanged, but it will require a lot of new capital to bring a large area back into working condition, and in reestablishing the labor forces.

THE EDITOR'S BOOK TABLE

"CONTRIBUTIONS TO THE KNOWLEDGE OF CAOUTCHOUC." BY H. Pohle, Kolloidchemische Beihefte, Band XIII. Heftes 1-2. Edited by Dr. Wo. Ostwald. Theodor Steinkopff, Dresden and Leipzig. Paper, 60 pages, 6 by 9 inches.

This is one of a series of monographs on pure and applied colloidal chemistry issued supplementary to the Kolloid-Zeitschrift. The first part treats of the influence of coagulation structure and part of albumen and resins in solubility, followed by experimental results on dimethylbutadien rubbers, especially changes of elasticity, improvement of durability in air, and the significance of bubbles in vulcanization.

In Parts II and III the vapor pressure method is explained and what it shows in the comparison of rubber with other reversible colloids, gelatine, cellulose, etc. The value of hygrometric figures is shown where determinations of resin content and aging is concerned. The monograph is followed by a bibliography, chiefly of recent articles on the chemistry of rubber.

"A. S. T. M. STANDARDS, 1921," Philadelphia, Pennsylvania. The American Society for Testing Materials. Cloth, illustrated, 890 pages, 5¾ by 9 inches.

This is the triennial volume of standards regularly issued by the Society and includes standard specifications and tests for ferrous and non-ferrous metals and miscellaneous materials. Among the latter are included methods of test for cotton rubber lined hose, and cotton fabrics. The book is invaluable to practically every branch of the engineering profession.

"NON-FERROUS AND ORGANIC MATERIALS." By Arthur W. Judge. Sir Isaac Pitman & Sons, Ltd., London, 1921. Cloth, 594 pages, 5¼ by 8¼ inches.

This two-volume illustrated work is designed to be a fairly complete elementary treatise on the subject of engineering materials intended for automobile, air-craft and general mechanical work. The first volume is confined to ferrous material while the second covers nonferrous metals, timbers and other organic materials. A chapter is devoted to a very condensed account of rubber and its compounds outlining its preparation, vulcanization, physical and mechanical properties and methods of manufacture. The hysteresis effect of rubber is treated and extracts are given from British standard specifications for rubber shock absorber cord for aircraft. Pneumatic tires for airplanes and rubber hose for use of gasoline are quite fully dealt with in specifications and tests.

NEW TRADE PUBLICATIONS

A NEW IDEA IN REGARD TO TIRE MANUFACTURING AND MERCHANdising is being advanced by George K. Culp, Inc., 56 West 45th street, New York, N. Y. A booklet, recently issued by the company, sets forth in detail the main features of the "Culp Plan," and incidentally describes the Culp cord tire. This brochure is an excellent example of modern printing.

The Weather Vein IS THE TITLE OF AN ILLUSTRATED MONTHLY publication of pocket size, issued by the Carrier Engineering Corp., Newark, New Jersey, and devoted to the spread of authoritative information and data on the Carrier system of air conditioning for industrial and other purposes. Each number is devoted to a special problem such as drying, dehumidification, and various industries in which conditioned air is essential.

THE WEAVER MANUFACTURING CO., SPRINGFIELD, ILLINOIS, SAID to have the largest factories in the world devoted exclusively to garage equipment, has recently established a branch factory at Chatham, Ontario, in order to supply the needs of Canadian patrons. The company's new catalog indicates the scope of its work, and the number of its products which include repairing and axle stands, tire spreaders and tire changers, rim anvils, jacks, truing fixtures, wheel alinement indicators, and many other devices. Auto hoists and auto ambulances for crippled cars should also be mentioned as important items in this company's very complete list of garage equipment necessities.

A GENERAL AND STATISTICAL REPORT ON THE PLANTATION RUBBER industry has been recently prepared by a representative of F. R. Henderson & Co., New York, N. Y. The period of survey extended over four months of the present year, while the countries visited included the Straits Settlements and Malay States, Sumatra, Java and Ceylon. Statistical tables of much interest have been prepared, which, however, make no claim to absolute accuracy, due to the fact that there are no statistical bureaus in the rubber-producing countries mentioned. A more extended account of this report will be found elsewhere in this issue.

BARNEY OLDFIELD, NOW A TIRE MANUFACTURER, BUT FORMERLY a well-known champion in automobile races, has recently given to the public some of his opinions regarding his experiences with tires in general, which experiences led to the manufacture of Oldfield tires. In a recent booklet, "Twenty-five Years of Record Breaking," he mentions several reasons for the durability and life of this particular brand, which is being now so extensively used for racing cars. These are: first, air-tight inner tubes of the best rubber, generously over size; second, durable casings, built of alternate layers of rubber and cotton; and third, a tempered tread of specially compounded rubber.

COMMERCE REPORTS, FORMERLY ISSUED BY THE UNITED STATES Department of Commerce as a daily, has now become, with the first issue, dated September 5, a weekly publication. News of the various industries, classified and arranged on a commodity and geographical basis, will be especially featured, and it is believed that this official trade paper will be of maximum utility to American business interests. Important advances in rubber industry affairs are indicated in this first weekly issue under the heading "Figures Showing Rubber Trade Development."

Golf Ball Manufacture

HISTORICAL

The game of golf antedates any record of its origin. For centuries its popularity was limited by the expense of the balls required for playing and the game was available only to the wealthy. For several centuries prior to the middle of the last, golf balls were made of hand-sewed bull's-hide, with seams turned toward the inside. These leather coverings were then tightly compacted with feathers. The size of the old feather ball was approximately 1-11/16 inches in diameter.

International

Wrapping the Rubber Core with Friction Tape

In 1848, gutta percha balls were first introduced into Europe, Sir Thomas Moncrieff, an English enthusiast, being generally credited with having conceived the idea of making golf balls of this material. It is claimed that the Rev. Robert A. Paterson, in 1845, rolled gutta percha clippings into a ball which he painted and used on the links.

Gutta percha balls soon became popular, as their price was about one-fifth that of the original feather balls. Golf was thus brought within the reach of many and the number of devotees increased. In making the earlier gutta percha ball, the gutta was boiled until soft and then rolled by hand until smooth and round. Its flight, however, was never true and, strange to relate, the more it was knocked and hacked about, the flight seemed to improve. This suggested to someone that the surface of the ball be nicked into lines and this was done with good results. The flight of the "hand hammered" ball was all that could be desired and the feather ball was superseded.

International

Forming Core Shells of Gutta Percha

MODERN GOLF BALLS

In the long course of manufacturing development that has produced the modern golf ball many interesting processes have been perfected. The patents on some of the more important have expired, notably the Haskell patent.

International

Winding Rubber Thread on the Core

THE HASKELL BALL

The structural feature of the Haskell ball as described in the patent was "a golf ball, comprising a core composed wholly or in part of rubber thread wound under high tension, and a gutta percha inclosing shell for the core, of such thickness as to give it the required rigidity." Specifications also included "a golf ball, comprising a central core section of relatively non-elastic material, rubber thread wound thereon under tension," etc.

International

Fitting the Shells and Thread-Wound Ball into the Mold

The Haskell ball, when first made, was produced laboriously

by winding rubber threads on the core by hand, and the total output for one man was three balls a day. After experimenting, a prominent rubber manufacturer devised a machine that made a ball a minute.

MAKING GOLF BALLS

The principal stages in the manufacture of a golf ball are shown in the accompanying illustrations. The first stage consists in hand wrapping a core piece of soft rubber with friction tape to serve as a center upon which to wind vulcanized rubber

International

MOLDED BALL SHOWING MARKINGS

thread under tension. This is done by a power-driven device in which the ball center is revolved rapidly on a variable axis as it is held between three rolls, one of which transmits the power required, while the operator regulates the tension on the thread. This winding constitutes the body of the ball and imparts to it great resiliency.

The outer covering of the ball consists of two hemispherical shells of tough gutta percha stock formed up cold in a power press from sheet stock about one-eighth inch thick. These halves are trimmed and fitted together over the thread-wound ball, united

International

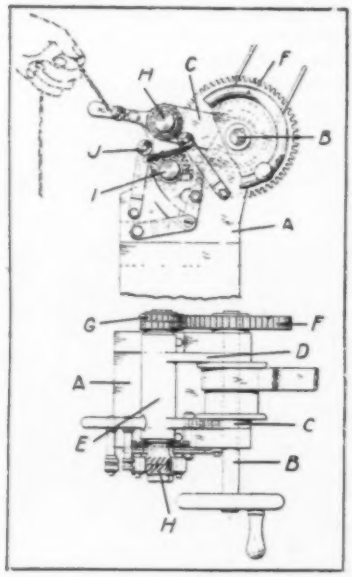
FINAL OPERATION—PAINTING THE BALLS

to it and around their juncture by mild heat and heavy pressure. The molds are of steel, each cavity engraved with the markings that the ball is to bear.

The next and final operation is that of painting, the paint being very evenly distributed over the surface of the ball by rolling it between the palms of the hands.

WINDING MACHINE

A side elevation and plan of a machine for thread-winding golf-ball cores is here shown. Elastic thread is wound in different great circles around the core, at the same time being evenly distributed over the entire body of the ball by the automatic action of this machine. The upper illustration is a side elevation and the lower view is a plan of the machine. The two side frames *A*, support the mainshaft *B*, that is provided with a hand-wheel and belt drive. Pivoted on this shaft are two horizontal arms *C* and *D* that support the bearing *E*, through which pass a tubular and a solid shaft. Directly under the upper bearing is a similar bearing bolted to the frame and through which pass tubular and solid shafts similar to those in the upper bearing. The spur gear *F*, fixed to the main shaft, meshes with two sets of pinions of different pitch, being keyed to the upper tubular and solid shafts, respectively, while the other two pinions are keyed to the lower tubular and solid shafts. On the opposite ends of the upper shafts are two knurled disks *H*, and similar disks *I* are attached to the corresponding ends of the lower shafts. Due to the different pitch of the driving pinions the inside upper disk revolves at the same speed as the lower outside disk, and the upper outside disk revolves at the same speed as the lower inside disk, the former pair rotating slightly faster than the latter pair. A ball retained between these disks will be rotated slowly about an axis which passes through the axis of the two shafts, thus winding the elastic thread in different circles around the core.



MACDAID'S WINDING MACHINE

The ball is held in position by rollers *J* and *K*, mounted on the ends of two pivoted arms provided with spring tension. For removing the ball, the upper bearing, being pivoted to the main shaft, is raised and lowered by the handle provided for that purpose.

GOLF BALLS WITH LIQUID CENTER

Eight or ten years ago there was made in the United States a golf ball with liquid center, the liquid being a concentrated solution of zinc chloride under heavy pressure. On being cut apart the ball would spring open exposing a mass of rubber bands under high tension holding an inside ball formed of a large number of laminated sheets. Serious accidents to players occurred in the use of this ball and resulted finally in its being withdrawn from sale.

METAL AND LIQUID CENTER

Another patented ball embodying the liquid center idea is here shown, and in which a ball having a greater specific gravity than the liquid, is free to move about, with the object of aiding flight and insuring better control of the ball.

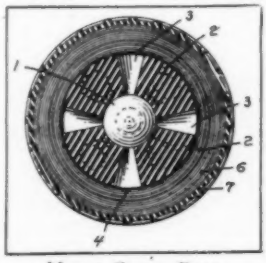
The golf ball comprises a container *A* made of double texture fabric and filled with liquid *B*. Rubber tape *C* is wound under high tension around the container *A*, and rubber threads are then wound around the tape windings as indicated at *D*. Finally the cover *E* is applied, which may be of any wear-resisting material

such as gutta percha. The ball *F* is of a specific gravity greater than the liquid, and is made of hard composition or hardened steel with a smooth surface to prevent puncturing the container. While there is only one inner ball shown, more than one can be used if desired.

Another patented liquid center golf ball provides an inner rubber bag or container filled with liquids of different specific gravities, one of which is mercury.

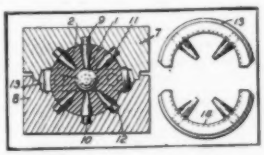
METAL-CORED GOLF BALL

Referring to the illustration, *1* is a solid metal ball or core around which is molded and vulcanized a rubber ball core, *2*, provided with fourteen pockets, *3*, six of which extend to the central metal core, formed on pins that accurately hold the core in the mold, while four pockets are provided on the equatorial and five on each hemispherical circumference of the rubber core. A thin vulcanized rubber coating, *4*, is then applied, to which a thin rubber cap is cemented, when the ball is wound with rubber thread, *6*, and the outer cover, *7*, preferably of balata, molded on the sphere.



Metal-Cored Ball

The construction of the mold used to make the metal-cored ball just described is shown herewith. The mold sections 7, 8, 13, 14 are provided with tapering radial pins 9, 10, 11 and 12, which converge to a common center and are symmetrically disposed. Some of the pins may be long enough to support a hard core (1) to be embedded in the material (2) of the ball. In the construction shown, the mold consists of four sections, two (13, 14) of which form the equatorial part of the ball. When molded, the material is drawn off the pins, and the ball is completed as described above.

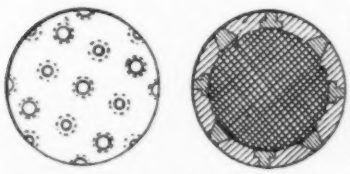


Mold for Metal-Cored Ball

Like other products formerly made in rubber factories, golf ball manufacture has become a specialty in the hands of concerns with ample capital to develop and perfect new ideas and the special machinery required, and the industry is surrounded by patent protection.

EXAMPLE OF GOLF BALL THEORY

An illustration of theory applied to golf-ball construction is that found in British patent No. 160,696 granted to an American inventor. This invention relates to the construction of a golf ball comprising a resilient core and a core-enveloping shell having a surface with smooth portions interspersed with abrasive portions, the smooth portions in some instances being rendered relatively elastic. This ball has an elastic center surrounded by a shell with perforations in which are embedded plugs of metal or hard rubber containing carborundum. Whatever the character of the plug, the exterior of the shell is a continuous spherical surface. A modification of the same invention covers a resilient ball center with cup-like depressions spanned by the shell to render those portions more yielding upon impact with the club. When a stroke is made, the outer surface of the ball is temporarily deformed, causing the ball to roll up the face of the club.



The India-Rubber Journal

Elastic Center and Perforated Shell

INTERESTING LETTERS FROM OUR READERS

STATEMENTS QUESTIONED

To the Editor:

Dear Sir: I have been very much interested in reading a couple of articles in The India Rubber World which contain some rather surprising statements. For instance, in the June, 1921, issue, on page 663, Arthur E. Friswell makes the statement that owing to climatic conditions, principally humidity, twice as much sulphur is required to effect the same cure in Manchester, England, as is required in Massachusetts. This in spite of the fact that during the cure the rubber sheet is *totally immersed in water*.

In July, 1921, issue, on page 742, Frederic Dannerth makes the statement that since the melting point of gas black is over 6,500 degrees F., it is a "material of preeminent importance in cases where the finished rubber product is exposed to high temperatures."

As you know, most of the inorganic materials used also have fairly high melting points and why this statement should be made at all is utterly incomprehensible as the softening point of rubber compounds is not materially affected by the presence of the fillers.

W. J. Kelly.

Akron, Ohio.

A. E. FRISWELL'S REPLY

I can only assure your correspondent that the fact of additional sulphur being required to effect vulcanization under the atmospheric conditions prevailing in Manchester, England, is as stated in my article and that I was also obliged to increase the sulphur in a number of the tire compounds which I put into use there, from what had for years given good results on this side. I am unable to give any chemical explanation but am sure that your correspondent will find that this practice obtains and is compelled under the conditions, if he is in a position to investigate.—Arthur E. Friswell.

DR. DANNERTH'S EXPLANATION

The softening point of rubber compounds is materially affected by the presence of organic fillers. There are also many inorganic substances which cannot be used in rubber compounds because they decompose when heated to 300 degrees F. In view of this fact, a substance which has a melting point far above that of superheated steam—as it is found in industrial plants—must be of preeminent importance as a filler.

The reader should not fall into the error of thinking that gas carbon black is the only substance which is stable at high temperatures. There are a great number of these heat-resisting substances at the disposal of the chemist, and each one has certain peculiar properties which govern its use in rubber compounding.—Frederic Dannerth.

MR. KELLY'S COMMENTS

In reply to Mr. Friswell's comments, it may be entirely possible that it was necessary for him to use more sulphur in vulcanizing stocks in England than in vulcanizing the same stocks in this country. However, this difference was not necessitated in any way, shape or manner by the variation in the humidities between the two places. If Mr. Friswell will kindly explain why in curing under water in England the cure takes place in a more humid environment than when curing under water in America, I should be indeed glad to hear it.

In regard to Mr. Dannerth's statements: The heat-resisting properties of compounds are dependent almost entirely on the degree of pigmentation, provided that all the pigments used have melting points above that of vulcanized rubber. In other words, for heat-resisting properties, barytes, zinc oxide, or clay will have exactly the same properties as lampblack if present in equivalent amounts. My objection to Dr. Dannerth's statements being that the melting point of the compounding material has absolutely nothing to do with the heat-resisting qualities of the resulting stocks, provided, of course, that the melting point is higher than that of the vulcanized rubber.—W. J. Kelly.

Safeguarding Spreading and Mixing Fire Hazards in Rubber Mills[1]

THE severe losses to both life and property in spreading and mixing rooms, where highly inflammable volatiles are used, indicate that these processes in relatively few cases are arranged in even a moderately safe way. Suggestions for safeguarding fire hazards of this sort have been prepared in the form of specifications covering plant construction, operation and special fire protection. These suggestions are given below in brief form.

CONSTRUCTION

The building should be detached and the units built as small as possible without crowding such hazardous work into rooms too small. Those shown in the illustration are about the minimum which should be built. Where absolutely necessary to have the building adjoin other buildings, it should be thoroughly cut off, the single connection being through an open corridor protected by double fire doors as is shown between the two sections of the building.

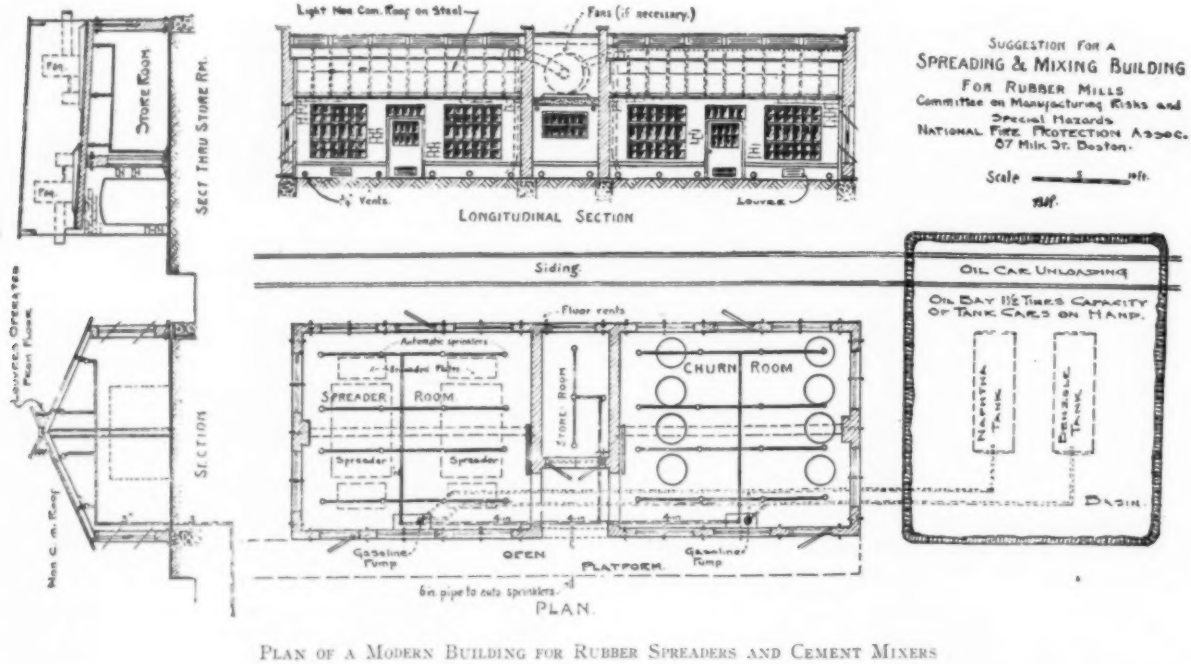
It is essential that the rooms have windows on three sides to insure good natural lighting and ventilation, to make the rooms easily accessible for rescue work, and for ready application of hose streams in case of fire.

WALLS AND ROOFS.—The walls should be of heavy masonry, the floor of reinforced concrete and the roof of light non-combustible material not heavily anchored to the walls or trusses that it may be lifted in case of an explosion without material damage to other structural features. The trusses and beams should be securely anchored to the walls and support all piping, etc.; nothing being fastened directly to the roof.

CUT OFFS.—No direct communication should be permitted between the churn and spreader rooms or other sections of the building, if it is subdivided. Stock may be transferred from one room to another through a corridor open to the outer air, but roofed over for protection, the openings into the two sections being protected by standard automatic fire doors.

The two rooms are divided by two separate parapeted blank fire walls which should be absolutely without openings; all pipes, shafting or electric wires should be buried in the floor and rise upward into the rooms. The room should have an outside window and be provided with fire doors with raised sills as are the other rooms. It should have a fireproof ceiling which may serve as a platform upon which fans may be mounted to eliminate the introduction of the fan hazard in the hazardous rooms.

EXITS.—Emergency exit doors for the ready escape of the employes should not have raised sills. They should never be locked. Large windows should be provided with a double row of movable sashes for ventilation near the floor as well as above. The windows should be glazed with lightweight plain glass to minimize the possibilities of accident. The use of heavy glass will intensify an explosion, obstruct hose streams and probably result in more serious accidents. The trucking platform is purposely made narrow and without a roof to discourage its use for storage. It should be of concrete and filled in to eliminate a space beneath it.



PLAN OF A MODERN BUILDING FOR RUBBER SPREADERS AND CEMENT MIXERS

VENTILATION

NATURAL VENTILATION.—Sufficient natural ventilation should be provided that the use of all fans may be eliminated. This necessitates adequate ventilation at the floor level that heavy vapors may flow out and fresh air enter. To permit this it is essential that the floors of the rooms be located two or three feet above the grade. Pipes should be located practically at the floor level

[1]Report of the committee on manufacturing risks and special hazards, National Fire Protection Association, Boston, Massachusetts.

and pitch downward slightly toward the outside to aid the drainage of heavy gases or liquids. Steam vents are provided near the ceiling of the storeroom to permit a good circulation of air. In addition to these pipes, louvres are placed in the exit doors, and in the walls of large rooms as substitutes for vent pipes of inadequate capacity.

The monitor with movable louvres is provided the full length of the workrooms in order that the draughts may be regulated in accordance with the direction of the wind, to get the desired circulation. The scheme of ventilation is to provide thorough circulation of air and the elimination of hazardous vapors without the use of fans.

Steam pipes should be placed overhead not only for heating purposes, but also that the air at the upper part of the room may be warmed to support the extra weight of water and gasoline vapor which will develop from the process and aid in eliminating vapors through the monitor.

FANS.—If fans must be used, outside installation is advised as the introduction of fans into such hazardous rooms materially increases the fire hazard and should not be permitted. Each separate compartment should have its individual fan. In no case should a common fan be used which would involve direct connection through the fans and tubes from one fire section to another. Fans should exhaust air from the floor level as well as the upper part of the room to insure the elimination of both light and heavy vapors. Also, their switches, starting boxes and motors, or other source of power should be located outside to eliminate belts and all power hazards from the workrooms.

USE OF VOLATILE LIQUIDS

The transportation of all inflammable volatiles and mixtures in portable cans should be eliminated so far as possible. By the use of special pumps, compounds may be discharged from the churn room to the spreader room and from the volatile storage tanks to the workrooms. In all cases such pipes should pass under the fire walls, entering the rooms upward through the concrete floor. Each room should be provided with hand pumps for the gasoline, benzol, etc., drawing from the buried pipes, which should be arranged to drain backward to the supply tanks, all as specified in the National Fire Protection Association rules covering the storage and handling of hazardous liquids.

The use of open pans and pails of highly inflammable liquids should be prohibited. Non-combustible solvents may be used for cleansing the workman's hands, spreader knives, etc. A solution of 60 per cent carbon tetrachloride and 40 per cent benzine or naphtha is not more hazardous than ordinary kerosene, and is strongly recommended.

Buried tanks for hazardous liquids should be provided with vent pipes and other fittings as specified in the National Fire Protection Association Rules. Tank cars from which the underground tanks are filled should be located during unloading inside an earthen dike or over a slight depression so that if accidentally discharged on the ground the inflammable liquids will be confined to a small location. Tank cars, whether full or empty should be kept away from all buildings.

SOLVENT RECOVERY SYSTEM

Solvent recovery systems may be considered as tending to safety when properly arranged, efficiently operated and designed to handle large volumes of air in relation to the contents of inflammable gases. The solvent recovery apparatus should be located in a fire-proof building above grade, well detached from all other buildings, preferably over 100 feet distant, all being so arranged as to fully recognize the probability of an explosion in this building.

SPECIAL FIRE PROTECTION

GROUNDING.—Special attention should be given to grounding all metallic parts of the building, trusses, metal window frames, and of all apparatus therein. A thoroughly grounded metallic plate for the employes to stand on should be placed on the floor in front of the spreaders and churns. Employes should not wear rubber heeled or soled shoes, leather soles with brass nails being used to insure grounding the employe. Steel nails in shoes may result in sparks. Grounding should include all the piping, churns, spreaders, pumps, tanks, etc., and extra grounds with collecting points should be provided to collect static charges from the cloth passing through spreaders and from all belts and other moving objects. For spreaders there should preferably be a grounded metallic idle roll on the cloth. The outlets into churns or spreader tanks from all fixed piping, also portable cans, or portable lamps, should be provided with chains or other proper grounds to connect them to the metallic parts of the machine. Trucks should be eliminated from the rooms so far as possible and where used should have bronze or brass wheels, or if rubber wheels are used, there should be a short chain in contact with the floor to ground the truck. Men working on machinery, especially when cleaning the knives of spreaders, should form the habit of grasping the machine with one hand while working with the other that they may ground themselves and thereby avoid the transmission of sparks.

Where necessary, shafting and belts should be run at the lowest possible speed and static collectors provided on the belts. Cloth on spreaders should be run as slowly as possible, preferably not exceeding fifteen yards per minute. Twenty yards per minute might be run with fair safety if precautions are taken to maintain extra humidity.

All electrical apparatus should be eliminated from inside the rooms as far as possible. Where necessarily inside, they should be inclosed, preferably with fire screen gauze. All motors, starters and switches and like apparatus should be of the non-sparking type and approved for use in inflammable atmospheres. All wiring should be in conduit and all lamps solidly attached to the fixtures. Lamps should have keyless sockets, be protected by vaporproof globes and where liabile to injury, by wire guards. An outside main switch should be provided to cut out all current for both power and light within the building.

HUMIDITY.—A humidifying system should be installed to maintain during operation an atmosphere in the room containing not less than four and not over seven grains of moisture per cubic foot. It is found that in the summer when the air is charged with four or five grains of moisture, very few fires occur. A humidity indicator should be provided to constantly denote the humidity present. In the dry cold months of the year, the use of humidifying apparatus is essential, if fires from static charge are to be eliminated.

FIRST AID.—Steam hose under moderate pressure should be provided at the spreaders to enable the workmen to blow out the fires. Such protection has been found of much value to extinguish spreader fires and protect the workmen. One inch or larger solid rubber hose without nozzle is the best for this service. For the protection of spreaders the introduction of a small amount of steam from a perforated pipe located just in front of the knife is a marked safeguard to prevent the formation of static sparks at the knife. This steam furnishes sufficient moisture to transmit the charges to the grounded machine without forming a spark.

Approved hand extinguishers should be provided, some of the foam type and some of the type containing carbon tetrachloride. All open tanks necessary for the operation of spreaders should be equipped with overlapping covers arranged to close automatically by approved heat-releasing devices. Where other apparatus makes it impossible to operate such a cover, the tank may be protected by approved foam extinguishing apparatus arranged, automatically, to cover the surface of the inflammable liquid with foam in case of fire.

SPRINKLERS

An automatic sprinkler system should be provided with about twice the usual number of sprinklers, as it is assumed that the volume of heat in fires in these rooms is such as to demand more water for cooling purposes than for ordinary fires.

FIRE PREVENTION IN RUBBER SPREADER AND CHURN ROOMS

By F. J. Hoxie[1]

THE general principles of fire protection engineering are divided into prevention, extinguishing and subdivision. Prevention is capable of most valuable results but is always associated with an uncertain personal factor dependent upon human carefulness, therefore methods of extinguishing have generally been given the most study in order to avoid or compensate for this factor. Subdivision is particularly necessary where easily ignitible fluids are present and generally determines whether a process involving such fluids is a desirable or an undesirable risk.

A fundamental principle is to keep valuable materials damageable by fire or water well separated from processes in which fires are frequent. For example, a spreader room may be made an acceptable risk by rigidly excluding from it all materials which can be damaged by fire.

PREVENTION

The most frequent cause of fire in processes involving readily ignitible solvents is static electricity. Fire records show that about three-quarters of the rubber factory fires in processes in which benzine is used, occur in the winter. This indicates that more than one-half of the fires in rubber factories can be prevented by maintaining in winter an absolute humidity in rooms where benzine is used, of about the same amount as provided by nature in summer; that is, about 4 or 5 grains of moisture to the cubic foot of air. The illustrated curve taken from the combined experience of the insurance companies' fire records shows clearly the relation between absolute humidity and fires.

It is difficult to measure absolute humidity with any convenient form of apparatus, but so long as the temperature of the room is nearly constant the absolute and relative humidities are proportional. Recording hygrometers of commercial accuracy give the relative humidity and keep a continuous record of the humidity on a paper chart. This will show when the danger point is being approached and will form a check on the ventilating and humidifying systems.

STATIC ELECTRIC SPARKS CAUSE BENZINE FIRES

A common remedy recommended for fires in churn and spreader rooms has been to ground all metal apparatus and to place combs as collectors on belts, cloth, spreader knives, etc. This is doubtless desirable and would probably be effective if it were possible to ground all conductors with considerable electrostatic capacity, but the chief source of fire is the electrostatic capacity of the bodies of the men. The electrostatic charge generally originates in a spreader room on the cloth which is being drawn over the steam tables. The workman frequently wears rubber bottomed shoes which are good electrical insulators, and stands on a dry floor with his knees against this roll of cloth. When the coating is completed he takes the cloth from the machine and by this means rubs off considerable of the electrical charge, which, with the insulating shoes and floor and a dry atmosphere, he is able to retain on his body for some time—several minutes—under favorable conditions. He reaches for a can of cement or towards the knife of the spreading machine and a spark from his finger to the metal ignites the vapor, to the entire mystification of the man who caused the fire, the spark being so small as to escape notice in the excitement of the fire. A man who gives out little moisture from his skin is particularly subject to this phenomenon.

Hence, it is desirable to provide grounded metal plates in the floor in front of the knife of the spreading machine where the man and cement can would generally stand, and to avoid rubber bottomed shoes. If the moisture in the atmosphere is maintained at 4 or 5 grains per cubic foot, neither man nor cloth on the machine can accumulate and hold a charge for any considerable length of time.

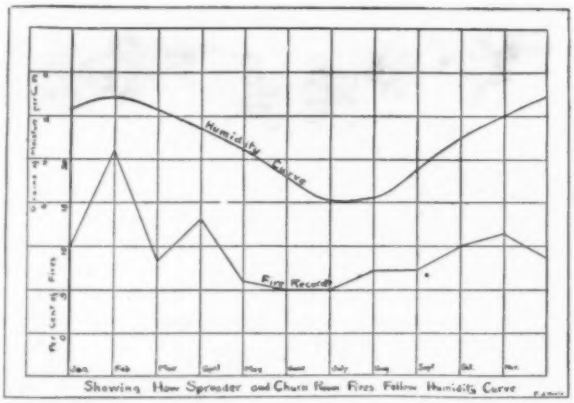
[1] Engineer, Boston, Massachusetts.

The origin of the electrical charge on spread or impregnated goods is doubtless connected with the evaporation of benzine or water from the fabric. It has been shown that a handful of waste taken from benzine leaves a charge on the waste and the benzine. Similarly, filtering benzine through chamois or cloth causes an electric charge to form.

The location and relative magnitude of the charge on the cloth can be easily shown by a thread or piece of woolen yarn about a foot long held near the cloth. It will be drawn towards the charge with a force proportional to the magnitude of the charge.

METHODS OF VENTILATION AND HUMIDIFICATION

In a spreader room in which large quantities of solvent are being evaporated freely into the air a very large amount of air will be required to carry away this solvent in order to keep the



air sufficiently clear for the comfort of the workmen. Moreover, when the air of such a room is kept sufficiently free of the solvent for comfort it is well below the explosion limit of the gas. Where there is discomfort to the workmen there is always great danger.

AIR AND MOISTURE REQUIRED FOR VENTILATION AND HUMIDIFICATION

Every gallon of benzine evaporated will require 3,000 cubic feet of air to reduce the vapor to its lowest explosive limits. This concentration of vapor, however, will doubtless be found highly disagreeable to the workmen so that two or three times as much air, at least, must be supplied in order to secure tolerable working conditions. If a spreader room in which 60 gallons of benzine are evaporated in one hour or one gallon in a minute, which is not an excessive amount with some processes in use at present, an air circulation of about 10,000 cubic feet a minute could well be provided.

In many cases the updraft caused by the high temperature of the spreading machine will be sufficient in itself to circulate the required amount of air if abundant inlets are provided near the floor for admitting the fresh air. Where large openings are required they should be fitted with steam coils for heating and jets for humidifying the air, liberal outlets being provided at the ceiling for carrying away the hot air and vapor.

Benzine vapor is heavier than air but when the vapor is present in the proportion of less than two per cent and the mixture is heated, the hot mixture of benzine vapor and air is much lighter than cold air with the result that the hot vapor will readily ascend if a sufficient opening is provided in the roof for its escape. If natural ventilation is to be depended upon in a room in which a gallon of benzine a minute is being evaporated, a free vent area of 20 square feet should be provided for both incoming and outgoing air in order to keep the air velocity down to 500 feet a minute, which is probably as rapid as could be depended upon. A greater vent area would be advisable if there is any probability of its being obstructed.

The amount of charge on the cloth on a spreading machine is a function of the speed of the machine as well as the humidity, in other words, a spreading machine which would cause no fires when run at a speed of 15 yards a minute at a given humidity would probably require a much higher humidity to run at 20 yards without fires, other conditions being the same.

Progress in Rubber Mask Production

RUBBER GHOST-MASKS

Ghosts with rubber heads and hands have added a new element of mystery to motion pictures. In "The Conquering Power," an adaptation of one of Balzac's novels, a scene shows Père Grandet in his treasure room terrified by the spirit of gold, which he has worshiped for a lifetime, rising from his strong box to crush him. The eerie effect is produced by

The Spirit of Gold—Rubber Mask

double photographic exposure, but the "spirit" is an actor wearing a rubber mask which envelopes head and neck, and who also wears specially made rubber gloves with claw-like fingers.

A PATENTED INVENTION

The making of rubber masks, deformed hands, and other anatomical abnormalities, first described in The India Rubber World, May 1, 1921, and developed by Alex Hall, a Los Angeles sculptor, is now conducted on an extensive scale for the motion

Making Forms Upon Which Rubber Masks are Built

picture industry by a company controlling the patents issued for Mr. Hall's invention. The patents cover all forms of masks, or parts of masks, for any part of the body or for use in any masquerade revel or theatrical exhibition.

LIFE-LIKE EFFECTS OBTAINED

The technique of manufacture is being constantly improved, and the masks, originally heavy and somewhat unwieldy, are now much lighter and more comfortable, and the coloring and "touching up" are much more artistic and life-like than before. The chief feature of the masks, "contortionableness," has been especially enhanced, so that the wearer can easily make these counterfeit presentments laugh, frown, and grimace in a remarkably realistic way.

PROCESS OF MANUFACTURE

The process of making the masks involves the molding of a suitable head and neck in clay, taking a plaster cast of the modeled article, filing off burrs or mold marks on the cast, coating the latter with shellac, and then dipping the cast repeatedly in a rubber cement solution until a sufficiently thick film has been obtained. Zinc oxide is used to secure a white mask and also in mixing with various aniline dyes in the solution. Black is produced with either drop black—frankfort black—or with carbon black, which also toughens the rubber mask.

Retouching with a brush dipped in rubber cement is sometimes done where wrinkles are desired, and features may be built

Rubber Masks in Use on the Stage

up by placing tire dough or other plastic behind protuberances, by immersing a part of the mask many times in the solution or by painting the part with cement many times. Oil colors may be used in some cases to heighten the effects of tints obtained by dipping or to accentuate various facial markings. Hair is added for eyebrows and beard, and wigs may also be attached.

EDUCATIONAL ADVANTAGES

While most of the rubber masks made thus far have been more or less grotesque, and while it is likely that there will always be a considerable demand for that kind for theatrical and carnival purposes, the concern which is producing this rubber novelty is also planning to make masks having a decided educational value. It is said that it will not be long before fine replicas will be supplied of sculptured features from the great museums of the world, and to which experts in the mimetic art will impart the semblance of life.

What the Rubber Chemists Are Doing

VARIABILITY IN PLANTATION RUBBER[1]

At the Rubber Congress held in connection with the Fifth International Rubber Exhibition, many interesting papers were presented on plantation and manufacturing topics. Among them, one by Dr. O. de Vries who discussed the question of variability in rate of cure of plantation rubber, reviewing data covering averages obtained from many hundred tests. These data and the author's comments are quoted below.

CAUSES OF VARIATION

The largely varying and often excessive tapping systems applied in former days, and especially during the boom period, have gradually disappeared and regular and uniform treatment of the trees is now in vogue, which is probably one of the chief causes of the greater uniformity in plantation rubber. Heavy tapping gives a rather quick-curing rubber, and systems with four and more cuts over a large part of the circumference must have resulted in rather large deviation in that direction. On the other hand, tapping trees that have had a rest gives, during the first days, an abnormally slow-curing rubber, and tapping for only short periods, say a month, as it was practiced in the first years of plantation rubber, must have resulted in a very large range of variability in rate of cure, from very slow cures for the first day's rubber to rapid curing for later tappings.

Resting trees that had been overtapped, stopping tapping during the dry months, etc., are so many more factors that caused large variability in curing capacities and are now avoided in the well-regulated operations of the present day.

Standardization of methods of preparation has undoubtedly done much to restrict variability. A certain degree of variability still exists. The ages and conditions of the trees vary from estate to estate. Local circumstances, type of factory and drying accommodation, intensity of supervision, etc., cause many minor differences in method of preparation.

AVERAGE VARIABILITY

To give an idea of the degree of variability now existing in the two principal types of plantation rubber, the following figures are given for standard time of cure of more than 1,900 samples of ordinary estate rubber, taken from our testing results during four years.

	Smoked Sheet		First Crêpe	
Year	Number of samples	Time of cure	Number of samples	Time of cure
1917	295	99 ± 9.8	265	119 ± 8.7
1918	195	95 ± 10.2	131	118 ± 6.7
1919	334	95 ± 10.4	241	110 ± 8.4
1920	234	93 ± 11.9	227	106 ± 7.0
Average	..	95.4 ± 10.6	..	113.3 ± 7.5
Four years	1,056	95.9 ± 10.5	864	113.0 ± 8.8

These figures for samples from the ordinary output of estates, as received for testing, do not give an exact idea as to the variability of the whole of plantation rubber, because they hold only for Java, and for not more than 150 out of the several thousands of separate estates on which rubber is produced. Nevertheless, they indicate that the "average deviation from the average" is about 11 per cent of the time of cure in the case of smoked sheet and 7½ per cent for first quality crêpe, and that it remained pretty constant during the last few years.

This is the degree of variation as it now exists, owing to the causes mentioned above, and to the fact that the market in general does not ask for greater uniformity and gives no recompense for greater care bestowed on rubber preparation.

That a much greater degree of uniformity can be gained by adhering strictly to standard methods will be clear from the following figures for estates which had their output controlled regularly by testing during the year 1920.

Sixteen estates preparing after the best known standard methods gave the following figures:

	Crêpe			Smoked Sheet	
Estate	Time of cure and variation	Extremes in time of cure	Estate	Time of cure and variation	Extremes in time of cure
1	115 ± 3	105—120	12	113.5 ± 2.5	108—120
2	112.5 ± 4	105—125	13	108.5 ± 5	100—120
3	113 ± 4.5	105—120	14	90 ± 3.5	85—100
4	106 ± 4.5	95—115	15	77 ± 2.5	70—85
5	107 ± 6	95—117	16	80.5 ± 4	75—90
6	103.5 ± 3.5	100—108			
7	110 ± 4.5	100—120			
8	103.5 ± 4	95—110			
9	96 ± 3	90—105			
10	97.5 ± 5	85—105			
11	105.5 ± 4.5	100—115			

The average deviation for crêpe is only 4.2 or about 3.8 per cent, that for smoked sheet 2.5 or about 2.6 per cent and therefore, in both cases much less than the variation of plantation rubber as a whole. For comparison we add some figures for estates that also had their output controlled regularly, but did not standardize their method of preparation as strictly as the above.

	Crêpe			Smoked Sheet	
Estate	Time of cure and variation	Extremes in time of cure	Estate	Time of cure and variation	Extremes in time of cure
17	116 ± 4	105—125	19	114.5 ± 6.5	100—125
18	111 ± 5	100—125	20	96.5 ± 9	85—110
			21	98.5 ± 8.5	85—110
			22	97.5 ± 8.5	85—110
			23	86 ± 8.5	65—105
			24	88.5 ± 7	67—100
			25	87.5 ± 5.5	75—105
			26	105 ± 6	95—120

The variation is larger than in the above list, but in the output of one estate it is never so large as in smoked sheet from a large number of estates.

OTHER VARIABLE PROPERTIES

Rate of cure is not the only property that should be taken into account in rubber testing. Tensile strength, slope—resistance to stretching at high elongation, and viscosity in dilute solution, are among those which have drawn the greatest amount of attention, and about which considerable statistical material has been gathered.

VISCOSITY

Viscosity in dilute solution is a very sensitive property, which is influenced by many factors and for this reason alone shows a rather large variability. Slope, on the contrary, is fairly constant for the better grades, and shows abnormal figures only with certain lower grades, especially those in which the rubber has deteriorated markedly.

TENSILE STRENGTH

Tensile strength shows a certain amount of variation. The figures for the lower grades may sink to very low values, especially for inferior types of rubber, or for those which contain particles of dirt. For the first grades, however, a certain variability in tensile strength also exists; certain estates regularly produce high figures and show up much better than others. It seems that the condition of the trees is the principal factor that determines the tensile strength of the rubber. An estate that shows low figures for tensile strength cannot always improve this at will. This is another point on which the output at one estate might deserve a certain preference above that of others, as far as inner properties are concerned.

COLD AUTOPOLYMERIZATION OF BUTADIENE

C. Harries in *Gummi-Zeitung*, 1921, 35, 898, reports that butadiene enclosed in sealed tubes for five years solidified to a hard white granular mass which still contained a little of the parent substance; the product, which was practically insoluble and showed no tendency to swell in the customary organic solvents, vaporized to a considerable extent when heated, and then suddenly melted with intumescence and carbonization.

[1] By Dr. O. de Vries, director of the Central Rubber Station, Buitenzorg, Java.

A CONVENIENT FORMULA FOR THE CALCULATION OF RUBBER ENERGY

By J. R. Sheppard[1]

IN the physical testing of compounded rubber it is frequently desired to obtain the "energy content," or more strictly speaking, the work required to stretch the rubber to the breaking point; since in general the greater this value the better is the quality of the rubber.[2] The unit ordinarily employed is the foot-pound per cubic inch.

The process of calculating the energy from stress-strain data may be rather tedious, especially when many results are required and one employs the method of estimating the area under the curve. The quickest way, no doubt, is to measure this area with a planimeter, but without this instrument the application of the formula or working rule given below will give the result with the minimum of calculation. The method is applicable to either the stress-strain data or to the curve plotted therefrom.

DEVELOPMENT OF FORMULA

Let T_1, T_2, T_3, ... be tensiles in pounds per square inch at 100 per cent, 200 per cent, 300 per cent, ... elongations.

Let T be breaking tensile.

Suppose that in a particular case the elongation at break is 635 per cent.

Now when a test piece originally 1 inch long has stretched 100 per cent, work done on one cubic inch $= \frac{O + T_1}{2} \times 1$ inch-pounds.

$$= \frac{T_1}{2} \text{ inch-pounds.}$$

Similarly on stretching from 200 per cent to 300 per cent, work done on one cubic inch $= \frac{(T_2 + T_3)}{2}$ inch-pounds.

On stretching from 600 per cent to 635 per cent, work done on one cubic inch $= \frac{(T_6 + T)}{2} \times \frac{35}{100}$ inch-pounds.

Thus the total work done on stretching to the breaking point is seen to be $\frac{T_1}{2} + \frac{T_1 + T_2}{2} + \frac{T_2 + T_3}{2} + \frac{T_3 + T_4}{2} + \frac{T_4 + T_5}{2} + \frac{T_5 + T_6}{2} + \frac{(T_6 + T)}{2} \times \frac{35}{100}$ in.-lbs. $= T_1 + T_2 + T_3 + T_4 + T_5 + \frac{T_6}{2} + \frac{(T_6 + T)}{2} \times \frac{35}{100}$ inch-pounds.

Or in general, if breaking elongation be (100 n + s) per cent, and if unit of energy be changed to the foot-pound, energy per cu. in. $= \frac{1}{12}\left((T_1 + T_2 + \ldots T_{n-1}) + \frac{T_n}{2} + \frac{(T_n + T)}{2} \frac{S}{100} \right)$ ft.-lbs.

WORKING RULE

The following statement based on this formula is a convenient working rule:

To get the energy from a stress-strain curve add together all but last two tensiles, half the second last tensile, and the average of last two tensiles multiplied by the last elongation increment expressed in inches. This sum divided by 12 will give the energy in foot-pounds.

[1]Chemist, Amos Helden McCready Limited, Montreal, Canada.
[2]W. B. Wiegand, Canadian Chemical Journal, June, 1920; The India Rubber World, October 1, 1920, pages 18-21.

ACCURACY OF FORMULA

In drawing stress-strain curves, the usual practice is to join the points representing the readings by straight lines, thus obtaining an approximation to the true (smooth) curve. The accuracy obtained by applying the above formula is equal to that of any other way of calculating the energy based on this approximate method of drawing the curve. The error, however, due to this approximation is small, and results in giving an energy content from 5 per cent to 1 per cent too high. However, as in commercial testing neither tensiles nor elongations are read with this precision, the accuracy is quite sufficient.

CHEMICAL PATENTS

THE UNITED STATES

VULCANIZED WASTE RUBBER CONTAINING FABRIC IS CONVERTED into a semi-hard rubber by impregnating the contained fabric with sulphur and subjecting the soft rubber to a semi-hard cure.—Stuart B. Molony, Wellesley Hills, Massachusetts. United States patent No. 1,384,773.

RUBBER WASH CLOTH. THE PROCESS OF PRODUCING RUBBER wash cloths consisting in subjecting a sheet of crêped crude rubber to the dissolving and curing actions of a solution of benzine and sulphur chloride.—Paul D. Steele and Albert E. Sidnell, Denver, Colorado. United States patent No. 1,384,871.

PROCESS FOR DISTILLING OCOTILLO AND THE LIKE, CONSISTING in subjecting the material to the action of heat, producing a carbonized residue, collecting the gases distilled, passing them through a condenser and returning the uncondensed gases to the heated mass at the point of highest temperature.—Samuel M. Darling, Washington, D. C. United States patent No. 1,384,939.

SHOE FILLER. A WATERPROOF SHOE FILLER COMPOSED OF HEATED bitumenated non-felted fibers is troweled into the cavity between the inner and outer soles. At ordinary temperatures the material regains a tough, resilient and pliable state.—Abraham Herbert, New York, N. Y., assignor to The Rubberoid Co. of New Jersey. United States patent No. 1,385,808.

REGENERATION OF WASTE RUBBER CONTAINING INCORPORATED fibrous material is recovered by extraction in a closed vessel with solvents at moderate temperature and pressure.—Constantin Georgi, Zehlendorf, near Berlin, Germany, assignor to V. B. Moler, Yonkers, New York. United States patent No. 1,385,869.

PURIFICATION OF INDIA RUBBER AND GUTTA PERCHA. SAND AND other impurities are removed from the material by milling in the presence of water containing hydrofluoric acid.—Christian H. Gray, London, England. United States patent No. 1,386,055.

PROCESS FOR THE VULCANIZATION OF RUBBER CONSISTING IN treating it with sulphur and a metallic salt of a dithiocarbamic acid, and heating it to a temperature lower than 100 degrees C.—Giuseppe Bruni, assignor to Pirelli & Co., both of Milan, Italy. United States patent No. 1,386,153.

THE UNITED KINGDOM

VULCANIZED RUBBER SOLUTIONS OR SPREADABLE DOUGHS OF undeteriorated vulcanized rubber suitable for waterproofing fabrics are obtained by vulcanizing masticated rubber in the presence of a solvent under suitably regulated conditions as regards, (1) concentration of the rubber solution, (2) the amount of vulcanizing agent added, and (3) amount of mastication. The vulcanization may be effected in the following ways: (1) by heating solutions of rubber and sulphur with or without other ingredients such as accelerators, in solvents having a higher boiling point than the temperature normally used for vulcanization; (2) by heating solutions having a low boiling point in a closed vessel; (3) by partially vulcanizing rubber and heating it with a solvent, or (4) by adding a limited amount of sulphur

chloride.—H. P. Stevens, 15 Borough High street, London. British patent No. 164,770.

Artificial Leather, consisting of one part of seaweed and two parts skivings of untanned hides, incorporated with an elastic binder such as rubber. The rubber is added, dissolved in a solvent. The product may be calendered, molded or applied to a fabric after treatment with a solvent.—A. J. Pheazey, 100 Fore street, and J. S. Campbell, 127 Shepherd's Bush Road, both in London. British patent No. 165,007.

Pads for Boots, Horseshoes, etc., composed of carborundum, raw or reclaimed rubber and sufficient sulphur for vulcanization.—J. R. Cooper, 46 Hadfield road, Birchfields, Birmingham, T. E. Lockhart, Brooklyn, Warwickshire, and A. O'Neal, Redditch, Worcestershire. British patent No. 165,130.

Gutta Percha Cement for uniting rubber and leather consists of about one part of deresinated gutta percha or balata dissolved in three parts by measure of carbon bisulphide. In a modification a thin layer of gutta percha is interposed between the leather and rubber stocks.—A. A. Crozier, Cambridge Street Rubber Mills, Bradford road, Manchester. British patents No. 165,572, and No. 165,606.

Wheel Tires. To increase adhesion of vulcanization between a solid rubber tire and a metal foundation band the latter is coated with a layer of a non-colloidal sulphur-terpene compound.—W. B. Pratt, Wellesley, Massachusetts. British patent No. 165,662.

OTHER CHEMICAL PATENTS

GERMANY

PATENTS ISSUED WITH DATES OF ISSUE

No. 329,676 (May 4, 1918) Manufacture of products resembling rubber. Badische Anilin & Soda Fabrik.
332,305 (March 28, 1918) Hindering oxidation in rubber-like products. Badische Anilin & Soda Fabrik.
332,347 (January 16, 1919) Increasing the elasticity of rubber vulcanizates. Farbenfabriken, formerly F. Bayer & Co.
332,974 (January 21, 1919) Drying rubber by means of indifferent gases. A. G. Metzeler & Co.

ANILINE POISONING

The Journal of Industrial Hygiene, June, 1921, publishes the following notes on aniline poisoning in the rubber industry:

Aniline and some of its homologs have a toxic effect on the blood and the nervous system, producing symptoms associated with internal suffocation. The poison may enter the system through the skin, the respiratory tract and the alimentary canal; intoxication, however, mostly occurs through respiratory absorption. The following preventive measures, among others, are suggested; forced ventilation; handling of aniline and its compounds in closed receptacles; restricted time of working in fumes of aniline; and protection of exposed parts of the body from contact with the chemical and removing it at once if spilled on the skin or clothing.

Sometimes vinegar is administered to the workers in order to produce a soluble compound of aniline which can be excreted through the kidneys. Dr. Davis recommends the use of lemonade containing epsom salts, which promotes catharsis and diuresis. It is particularly noteworthy that alcohol consumption aids aniline absorption, especially in young persons. When the actual intoxication has already set in the patient must be treated for lack of oxygen and acidosis.

THE VARIABILITY OF CRUDE RUBBER[1]

Attention is called to the fact that the usual method of testing for variability in crude rubber really determines the variability in the amounts and character of certain foreign substances which, in the absence of pigments which will produce an alkaline medium for the reaction, tend to obscure the variation which may exist in the rubber. Tests show that as little as 0.10 per cent of a remarkably strong acceleration is sufficient, in the absence of alkaline fillers, to retard the vulcanization almost entirely. It is recommended that all tests, intended to discover the variability in crude rubber, be performed on mixtures to which has been added from two or three per cent zinc oxide, in order to eliminate the retarding effect which might be caused by small quantities of foreign substances or decomposition products.

[1]By John B. Tuttle, "India Rubber Journal," August 20, 1921.

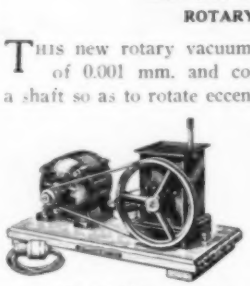
SHELLAC SUBSTITUTE

The rapidly advancing prices for genuine shellac give timely interest to substitutes. Among these products are the orange and white Perfection substitutes offered at less than half the cost of natural grades and suitable for use in making hard molded composition articles and varieties.

LABORATORY APPARATUS

ROTARY VACUUM PUMP

This new rotary vacuum pump is built to produce a vacuum of 0.001 mm. and comprises a solid cylinder mounted on a shaft so as to rotate eccentrically within a large hollow cylinder.

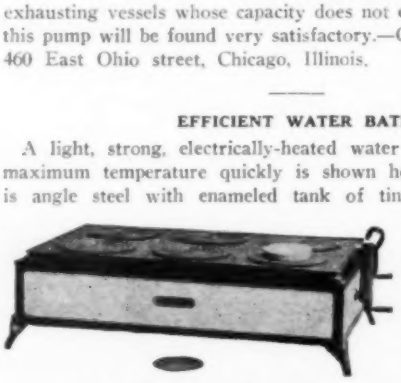


Cenco Hyvac Pump

The pump consists of two stages placed vertically at a slight angle to each other, with the rotors mounted on a common shaft. The stages are securely attached to one vertical side of a square cast-iron case, filled with special oil for sealing and having a removable lid through which passes the inlet tube. For exhausting vessels whose capacity does not exceed 10 or 12 liters this pump will be found very satisfactory.—Central Scientific Co., 460 East Ohio street, Chicago, Illinois.

EFFICIENT WATER BATH

A light, strong, electrically-heated water bath that comes to maximum temperature quickly is shown herewith. The frame is angle steel with enameled tank of tinned copper, and an automatic water level of brass. The heaters are of replaceable type controlled by snap switches which allow for boiling point and two lower temperatures.



A & S Water Bath

This bath can be quickly taken apart and reassembled for cleaning or other purposes. Certain of the leading rubber laboratories of the United States and Canada have found this form of water bath particularly advantageous in their work.—The Apparatus & Specialty Co., Lansing, Michigan.

GAUZE EVAPORATING DISH

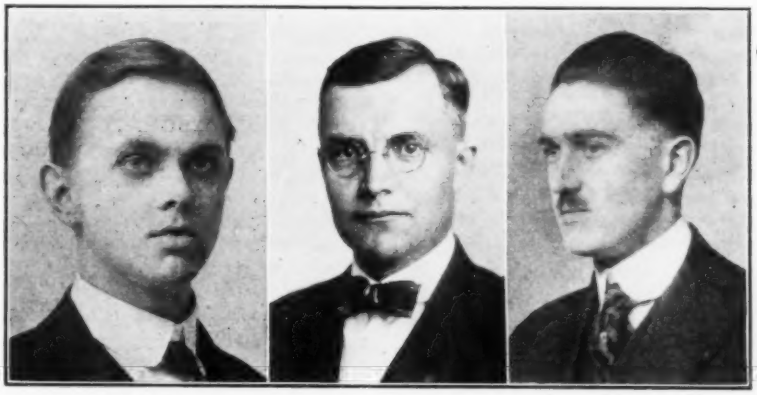
The Seidenberg gauze dish of platinum for the accurate determination of solids in liquids, particularly for organic substances and physiological solutions, consists of a fine-mesh wire supported in a dish and corrugated to present two surfaces of about 200 sq. cm. each. The grooves exert a strong capillary action so that the gauze will hold at least five cc. of any liquid without any of it going through the meshes. Dehydration, therefore, is uniform and carried on by action of the air on both sides of the gauze. On prolonged heating the loss of weight from "constant weight" is less than by other methods, demonstrating that the results secured are more nearly accurate.—American Platinum Works, Newark, New Jersey.

Meeting of the Rubber Division of the American Chemical Society

The sixty-second meeting of the American Chemical Society was held at Columbia University, New York, N. Y., September 6 to 10. The three days' program of the Rubber Division embraced a varied collection of papers on important problems concerning both crude and vulcanized rubber. Complete authors' abstracts of these papers will be found below.

A growing increase of interest and membership has demonstrated to the chemists of the rubber industry the value of these meetings. The attendance of rubber chemists at the New York meeting was about 200, representing all branches of the industry.

In the unavoidable absence of W. W. Evans, chairman, C. W. Bedford served most acceptably as chairman.



C. W. Bedford, Chairman — H. E. Simmons, Vice-Chairman — A. H. Smith, Secretary

Officers of the Rubber Division of the American Chemical Society

REPORT OF COMMITTEES

The committee on physical testing reported that since tests of tensile, elongation and set may be considered more properly within the province of the American Society for Testing Materials, it should be the policy of the physical testing committee to confine its work to matters of research testing, rather than routine testing. In this connection reference was made to the paper by W. W. Vogt, leading the general discussion on Methods of Plotting Physical Testing Data.

The committee on accelerators previous to the meeting distributed to members of the Division copies of the report on trade name accelerators. This report is regarded as confidential and is withheld from publication; however, it is available to rubber chemists on application to the secretary of the Division.

ELECTION OF OFFICERS

The following officers were elected for the ensuing year:

C. W. Bedford, chairman; H. E. Simmons, vice-chairman; A. H. Smith, secretary.

Executive Committee. Chairman, W. B. Wiegand, F. G. Breyer, W. W. Evans, J. B. Tuttle and D. F. Cranor.

COOPERATIVE RESEARCH LABORATORY PROPOSED

After the reading of the paper by Dr. O. de Vries on "The Preparation and Testing of Crude Rubber," the following resolution proposed by H. L. Fisher, C. Olin North and W. H. Whitcomb was unanimously adopted:

RESOLUTION

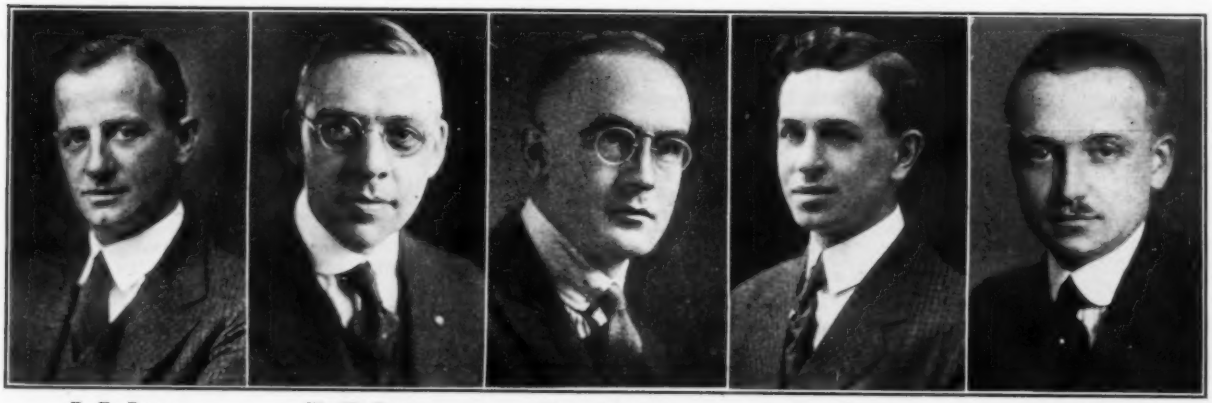
Whereas, It is a recognized fact that there are certain fundamental principles of general interest to the rubber industry as a whole, which no single company should be expected to go to the expenditure of the time and money necessary to fully develop.

Therefore, it is *Resolved* by the Rubber Division of the American Chemical Society, numbering approximately 200 representatives from all the leading companies, both large and small, of the United States and Canada, assembled at New York City, September 7, 8 and 9, 1921, that a cooperative research laboratory should be established under the auspices of The Rubber Association of America for furthering the investigation of such fundamental problems.

DOCTOR DE VRIES HONORED

The Rubber Division extended a very cordial welcome to Doctor O. de Vries, director of the Central Rubber Station, Buitenzorg, Java, who was in attendance, representing in his official capacity the Netherlands plantation industry. Following the reading of his paper, the chairman proposed that Doctor de Vries be made an honorary member of the Rubber Division, which was enthusiastically received and he was so elected by a unanimous vote.

In his remarks Doctor de Vries indicated that his visit to the recent London rubber exposition and to the United States at



F. E. Breyer — W. W. Evans — W. B. Wiegand, Chairman — J. B. Tuttle — D. F. Cranor

Executive Committee of the Rubber Division of the American Chemical Society

this time is to correlate the research work under his direction at the Central Rubber Station with the crude rubber quality needs of rubber manufacturers.

In pursuance of this object he propounds several questions, replies to which from rubber manufacturers and their chemists would greatly aid those in the Far East who are endeavoring to produce and maintain acceptable qualities of crude rubber. The questions are as follows:

(1) Should variation in rate of cure be still further reduced; that is, confined to a narrower range? (2) What is considered a reasonable time of cure? (3) What should be the maximum and minimum limits of the rate of cure? (4) Is rubber of highly uniform rate of cure of sufficient importance in rubber manufacturing practices to warrant its production, or is such rubber of value only for special manufacturing purposes? (5) What differences of milling quality (plasticity) are desired in different grades of plantation rubber?

These and other points will be formulated as a questionnaire and submitted by the secretary of the Rubber Division for replies by the members and the companies they represent. The opinions expressed will be tabulated and submitted to Doctor de Vries to serve as a guide in the development of rubber grades and properties.

NEW TYPES OF PLANTATION RUBBER

Doctor de Vries exhibited samples of three new types of plantation rubber. There were smoked balls, slab rubber and evaporated sheet. These are comparatively new commercial forms with characteristic properties. If found of special value by rubber manufacturers, they could be supplied in case the demand warranted it.

RUBBER RESEARCH JOURNAL

As a means of facilitating much desired cooperation between plantation rubber chemists and those of the rubber manufacturing industry, Doctor de Vries raised the question whether the time has not come for starting a journal for special rubber research as a medium for exchanging results.

ABSTRACTS OF PAPERS

MINERAL RUBBER

By C. O. North

This paper brings out the desirable and undesirable properties of mineral rubber in order that mineral rubber makers will appreciate more fully how their product is employed.

Changes in stress-strain relations, hysteresis losses, permanent set, energy of resilience and abrasion with increase in mineral rubber ratio to rubber are shown graphically.

Mineral rubber is essentially a plastic material. When rubber containing it is stretched, the mineral rubber flows with the rubber. On release the mineral rubber flows back with the rubber. The principal evidence of its presence is a slowing up of the return to normal after stretching. The production of logginess is the greatest factor against unlimited increased use of mineral rubber in rubber compounding.

MICROSCOPY OF RUBBER FILLERS

By Irene C. Diner

Among the properties selected for the miscroscopic differentiation of such materials as barytes, whiting, zinc oxide, lithopone, litharge, red lead, antimony sulphide, iron oxide and gas black, are size, color, shape, crystal structure, impurities and optical properties. These qualities afford the basis of a positive method of identification of these fillers based upon seventeen different measurable physical properties. A subsequent paper will give methods of estimating the percentages of the fillers so determined.

The miscroscopic method is short and positive, since it gives the exact state in which the filler is present rather than merely the amount of each element present and necessitating inference as to their association, for example: whether the substances present are pure or impure, hydrated or anhydrous, etc.

THE TETRA-HYDROXYPHENYL DERIVATIVE OF RUBBER AND ITS TETRA-METHYL ETHER

By Harry L. Fisher and Harold Gray

The tetra-phenoxy derivative of rubber described by C. O. Weber is shown to be the tetra-hydroxyphenyl derivative not only by the method of formation and by its solubility in aqueous sodium hydrate, but especially by the fact that it can very readily be methylated to the corresponding tetra-methoxyphenyl derivative. The reaction for preparing the hydroxyphenyl compound from rubber tetrabromide and phenol is like a Friedel-Crafts reaction, being speeded up by the use of anhydrous aluminum chloride, zinc chloride, etc. Other halogen derivatives of rubber, such as the dihydrochloride, also react with phenol.

RECENT DEVELOPMENTS IN THE ART OF RUBBER MICROSECTIONING

By Henry Green

A method for making miscrosections of rubber has been developed which is free from the various inconveniences associated with the method heretofore employed of freezing the sample with carbon dioxide and liquid air. The elasticity is destroyed and sufficient rigidity acquired by treating the sample with dilute sulphur chloride solution.

Sections are obtained ½-mm. by 4 mm. in area, which under a magnification of 1,500 diameters appear, in round numbers, as strips three feet wide by 20 feet long. This is sufficient to show all the characteristics of the sample. The sections can be made exceedingly thin, beautifully transparent and of uniform thickness.

PIPERIDINE-PIPERIDYL-DITHIOCARBAMATE AS A RUBBER ACCELERATOR IN THE PRESENCE OF ZINC OXIDE

By G. S. Whitby and A. H. Smith

One part of piperidine-piperidyl-dithiocarbamate in a mixture —90 of rubber, 10 of sulphur, 10 of zinc oxide—reduces the time of vulcanization at 141 degrees C. from three hours to less than one minute. At 131 degrees C. it reduces the time of vulcanization from seven hours to one minute. It is fully vulcanized in three to four minutes at 115 degrees C. When only two parts of sulphur are used the time of vulcanization is one minute at 141 degrees C., or two minutes at 131 degrees, or ten minutes at 115 degrees C.

THE DETERMINATION OF TRUE FREE SULPHUR AND TRUE COEFFICIENT OF VULCANIZATION IN VULCANIZED RUBBER—II

By W. J. Kelly

The application of the method devised for pure gum stocks[1] to compounded stocks. Free sulphur determined by the "saturated alcohol" method. For combined sulphur the sample is extracted with alcohol KOH and ether HCl. The latter removes any sulphide as H_2S and dissolves accelerators which form water on ether-soluble hydrochlorides. In this way considerable sulphur is removed in addition to that extracted by acetone and which had previously been considered as combined with the rubber. In some cases an additional extraction with water is necessary but the details of this remain to be worked out.

THE ACTION OF VOLATILE ORGANIC SOLVENTS AND VULCANIZING AGENTS ON ORGANIC COMPOUNDING MATERIALS AND RESINOUS GUMS

By Frederic Dannerth

The purpose of this investigation has been to obtain fundamental data for the industries which use plastic masses. The amount of matter soluble in certain liquids at stated temperatures has been studied. We have also noted: the amount of a given solvent which will mix with any other given solvent at a given temperature; the swelling action of certain solvents on stated organic materials; the action of certain vulcanizing agents on pitches and oils as well as their action on chicle, balata, gutta percha, and jelutong. The influence of the product has been studied, first using only organic compounding material and secondly using only the resinous gums.

[1]Journal of Industrial and Engineering Chemistry, 12, 875, 1920.

CORRECTED STRESS-STRAIN CURVES FOR RUBBER

By J. W. Shields

An improved method is explained for drawing stress-strain curves for rubber which takes into account the decrease in cross-section of the specimen. Such curves do not have the S-shape which is characteristic of uncorrected curves. The corrected curves show the modulus of rubber to be least at the smallest elongation and to increase gradually as the specimen is stretched. The method for determining the true modulus of unstressed rubber is illustrated. The equations for this curve are developed and the values of the equation constants given for several stocks.

THE DETERMINATION OF THE PARTICLE SIZE OF PIGMENTS

By W. W. Vogt

By a turbimetric method it is possible to determine the capacity of a pigment to extinguish direct light rays. This capacity, called "obscuring power," is a direct function of the average particle size of the pigment. The values of obscuring power are shown to be consistent with particle sizes as determined microscopically and furthermore to be in close accord with the practical compounding value of the pigment. Hence, by the determination of the obscuring power of an unknown pigment it is possible to predict what its practical compounding value will be in relation to known pigments.

REACTIONS OF ACCELERATORS DURING VULCANIZATION[1]—IV

By C. W. Bedford and L. B. Sebrell

Zinc sulphydrate vulcanizes rubber in the presence of sulphur at ordinary temperatures. Zinc persulphides are stable compounds and vulcanize rubber in heat curves far more rapidly than ordinary sulphur. Zinc salts of organic accelerators form polysulphides without decomposition into zinc sulphide and disulphides. Disulphides are changed to mercaptans by hydrogen sulphide and in the presence of zinc oxide they form zinc salts.

THE SOLUBILITY OF SULPHUR IN RUBBER

By C. S. Venable and C. D. Green

Values have been obtained for the solubility of sulphur in rubber at 55, 75 and 95 degrees C. The procedure used was essentially to pack thin rubber strips in sulphur, maintain at the desired temperature until equilibrium was reached, and then analyze for combined and free sulphur. Various precautions were adopted to insure that equilibrium was reached.

It was found that the solubility of sulphur in rubber increases slowly with the vulcanization coefficient, this increase being more rapid as the temperature increases. It was found that when this coefficient was greater than 7 per cent combined sulphur it was impossible to obtain solubility values by the method used due to the fact that the rubber becomes almost impermeable to free sulphur. This impermeability probably has more to do with the non-blooming of hard rubber stocks than the increased solubility of free sulphur. By extrapolating the curves obtained, it can be calculated that a stock having 4 per cent combined sulphur at 140 degrees C. will be saturated with about 15 per cent free sulphur.

THE PREPARATION AND TESTING OF CRUDE RUBBER

By O. de Vries

This paper concerns the same methods and problems as those contained in a paper on this subject presented by Doctor de Vries at the Rubber Conference held at the Fifth International Rubber Exhibition in London last June. An extended abstract of this paper will be found in the rubber chemistry section of the present issue.

DISCUSSION ON ACCELERATED AGING TESTS

Aging for 14 days in air at 130 degrees F., according to the method of W. C. Geer, indicates the natural aging over a period from four months to one year duration, according to the nature of the stocks.

J. B. Tuttle referred to aging tests on balloon fabrics conducted at the Bureau of Standards, in which the presence of light, heat and absence of light were found to be pronounced factors. It was advisable to conduct the tests in an atmosphere of inert gas to eliminate the oxidizing effect of air.

C. R. Boggs stated that he has found that heating samples in vacuum produces no aging effect, indicating that aging is due to oxidation by the air.

A. A. Somerville described a test used by certain manufacturers in the absence of laboratory facilities. This consists of placing numerous duplicate test strips in fruit jars sealed and immersed in boiling water. A series of tensile, elongation and set tests are made on samples withdrawn every two hours. Results are charted by plotting tensile against time. The decline shown in physical properties is a fair indication of the probable aging quality.

F. G. Breyer indicated that aging tests of the stocks should be made under working conditions. He exhibited thermo-couple probes with which it is possible to determine the internal temperatures of various portions of a tire heated in actual service. It is expected that these testing probes will shortly be available to those interested in investigating the internal heat conditions of tires under load.

B. R. Silver mentioned that in England road service tire temperatures are similarly taken by a leading tire company, using a hypodermic needle to introduce the thermo-couple.

G. S. Whitby stated that in the case of pure gum, continued vulcanization gives the same result as accelerated aging. This, however, does not apply to compounded stocks.

P. I. Murrill noted that in aging tests of explosives the relative effects of various low temperatures correspond with extension of keeping quality.

DISCUSSION ON MECHANISM OF RUBBER VULCANIZATION

Paul I. Murrill introduced the discussion as abstracted below:

The mechanism of vulcanization is so intimately connected with the use of accelerators which is now so general that this question might very properly be stated as a discussion of the action of accelerators. In the last ten years between 50 and 100 different chemical substances have been proposed as accelerators. These may be classified into about 17 groups. On account of cost, limited supply, volatility, poisonous or irritating action, etc., not more than 15 or 20 are of practical use. The first accelerators used were amines, or basic amino-compounds, which led to the theory that accelerating action was a function of basic character, but this theory had to be abandoned or modified in consequence of discoveries that many nitrogenous bases are not accelerators, while some accelerators contain no nitrogen, and others are not basic.

Other theories have been propounded to explain the action and to account for results, but it is an open question whether any one theory takes all known facts into account. The necessity or desirability of limiting any proposed theory to one or more groups of accelerators was suggested, rather than attempt to make a single theory fit all the facts. The "polysulphide" theory of Bedford was commented on favorably, and some of the high-power or "super-accelerators," such as the dithio-carbamates and the thiouramsulphides and disulphides, were touched on briefly.

STATISTICS CONCERNING THE TIRE FABRIC INDUSTRY

The Census Bureau in connection with the Department of Commerce in a recent compilation makes some interesting statements regarding the manufacture of tire fabrics. In the year 1919, it is said, tire duck formed over one-half the total value of all kinds of duck, and in itself was 9.6 per cent of the total value of woven goods. The figures for 1919 are as follows: tire duck, amounting to 128,174,000 pounds, or 121,745,000 square yards, was valued at $143,086,000, while tire fabrics, other than duck, amounted to 29,917,000 pounds, or 36,806,000 square yards, with a value of $32,602,000. According to this 1920 census, the cotton mills of the country included 1,290 establishments.

[1] An answer to Bruni, India Rubber Journal, 62, 1921, 63.

Seventh National Exposition of Chemical Industries

THE SEVENTH NATIONAL EXPOSITION OF CHEMICAL INDUSTRIES was held in the Eighth Coast Artillery Armory, New York, N. Y., September 12 to 17, 1921. Great interest was shown by the large attendance of chemists, manufacturers and the general public. All exhibits, over 400 in number, were arranged on the same floor which aided materially in their examination. Exhibits illustrative of practically every branch of the chemical industry were attractively displayed. These included products, machinery, processes and instruments for test and regulation.

In the auditorium every afternoon and evening papers were read by experts in many chemical and engineering lines on the relations of chemistry to the industrial development and defense of the nation. Many reels of moving pictures illustrating manufacturing processes were shown.

Among the exhibits of special interest to rubber manufacturers were the following:

ALLIS-CHALMERS MANUFACTURING CO., Milwaukee, Wisconsin. Dust-collecting system, rubber-lined sand pumps, and special induction motors for rubber mill service using alternating or direct current.

AMERICAN HARD RUBBER CO., New York, N. Y. Chemical equipment including hard rubber pumps, piping, fittings, tanks, laboratory and factory utensils, electrical and miscellaneous supplies, all of hard rubber.

BARBER ASPHALT PAVING CO., New York, N. Y. Genasco vulcanite flooring, asphaltic compounds, gilsonite, mineral rubber and other chemical products.

THE BRISTOL CO., Waterbury, Connecticut. Recording instruments for time, temperature, pressure, and electric current, etc. Special mention should be made of the newest development for electric recording of the above factors, up to several miles if desired.

CARRIER ENGINEERING CORPORATION, New York, N. Y. Air conditioning apparatus in action showing how weather conditions most favorable to manufacturing operations may be produced.

J. P. DEVINE CO., Buffalo, New York. Vacuum drying and vacuum impregnating apparatus and other machinery for chemical manufacture. The display was featured by enlarged photographs of actual installations of several different types of machinery.

DIAMOND STATE FIBRE CO., Bridgeport, Pennsylvania. Protective papers and special papers for rubber makers.

E. I. DU PONT DE NEMOURS & CO., Wilmington, Delaware. This company's prominence in chemical development was indicated by the space devoted to the reception of those interested in the company's products as chemicals, dyes, pigments, etc.

HUNTER DRY KILN CO., Indianapolis, Indiana. Model of the Hunter dry kiln for processing, under fixed atmospheric conditions of moisture, such materials as crude rubber, compounding ingredients and products in every industry where drying is a feature.

INNIS, SPEIDEN & CO., INC., New York, N. Y. Chemicals and manufactured and natural products for use in the industrial arts.

A. KLIPSTEIN & CO., New York, N. Y. Chemicals, colors, dyestuffs, gums, waxes, oils, etc., for use in the rubber industry.

MANHATTAN RUBBER MANUFACTURING CO., Passaic, New Jersey. Rubber goods for mechanical purposes were featured, as for example, belting able to withstand continuous operation in hot water; hose for all purposes, and hard rubber lined and covered centrifugal machines, pipes, fittings, etc.

MORSE CHAIN CO., Ithaca, New York, exhibited a large Morse rocker joint silent chain drive with the washers of the chain removed from one side and a revolving shutter arranged so that the rocking action of the joint could be followed as the chain went on and off the sprockets. The drive is capable of transmitting 100 horse-power and withstanding occasional overload of 100 per cent.

NATIONAL ANILINE & CHEMICAL CO., New York, N. Y. Chemicals of coal-tar origin and organic vulcanization accelerators for use in the rubber industry, and dyes manufactured in varied assortment by the company.

NATIONAL ROSIN OIL & SIZE CO., New York, N. Y. Rosin oil, Burgundy pitch and Venice turpentine especially prepared for rubber manufacturers and reclaimers.

THE NEW JERSEY ZINC CO., New York, N. Y. Complete line of zinc products made by the New Jersey Zinc Co. and Mineral Point Zinc Co., including zinc oxide, slab zinc, rolled zinc, zinc dust, albalith, lithopone, zinc sulphate, feathered zinc, salt cake, sulphuric acid, muriatic acid and zinc chloride.

ROESSLER & HASSLACHER CHEMICAL CO., New York, N. Y. Chemicals and vulcanization accelerators for the rubber trade, including hexamethylene tetramine, aldehyde ammonia, formaldehyde aniline and thiocarbanilide. Also golden, crimson and vermilion sulphurets of antimony.

SALMON FALLS MANUFACTURING CO., Boston, Massachusetts. Toron, toronized fabrics and samples of tires and belting made from toron-treated cotton. Fabrics conditioned for vulcanization by toronizing acquire increased technical value and the process is rapidly gaining favor with rubber goods manufacturers.

SCHAEFFER & BUDENBERG MANUFACTURING CO., Brooklyn, New York. Complete line of efficiency-promoting instruments; thermometers, pressure gages and other test and recording instruments for vulcanization and industrial purposes.

TAYLOR INSTRUMENT COMPANIES, Rochester, New York. Tycos temperature instruments, indicating, recording and controlling, for rubber and other manufacturing processes. A special feature was a display of the glass parts in the making of thermometers, etc.

WESTINGHOUSE ELECTRIC & MANUFACTURING CO., East Pittsburgh, Pa. Automatic regulator and control equipment for steel refining furnaces, motors for chemical industry, both alternating and direct current, together with control equipment; specially treated coils; George Cutter industrial lighting fixtures for both indoor and yard lighting, together with other electrical equipment especially designed for the chemical industry.

WHITALL TATUM CO., New York, N. Y. This company exhibited laboratory and other glassware and rubber goods, showing the process of manufacture from the crude material through to the finished product—specially featuring "Nonsol" chemical glassware.

OTHER EXHIBITORS

Other exhibitors whose displays were interesting to rubber men were the following:

JOS. BAKER SONS & PERKINS CO., INC., New York, N. Y., sifters and mixers for dry materials; CENTRAL SCIENTIFIC CO., Chicago, Illinois, laboratory supplies; THE CONTAINER CLUB, Chicago, Illinois, corrugated boxes; COOPER-HEWITT ELECTRIC CO., Hoboken, New Jersey, equipment and applications of ultra-violet light for testing purposes; EIMER & AMEND, New York, N. Y., laboratory supplies; GENERAL BAKELITE CO., New York, N. Y., Bakelite products; GENERAL ELECTRIC CO., Schenectady, New York, electric heaters and arc welding; HANOVIA CHEMICAL & MANUFACTURING CO., Newark, New Jersey, ultra-violet-ray lamps for aging tests; HEYDEN CHEMICAL CO. OF AMERICA, INC., New York, N. Y., chemicals; LUZERNE RUBBER CO., Trenton, New Jersey, hard rubber products; MULTI-METAL CO., New York, N. Y., wire cloth for sifting and testing; PALO CO., New York, N. Y., laboratory supplies.

PARKS-CRAMER CO., Boston, Massachusetts, heat and oil circulating systems, humidifiers; SARCO CO., New York, N. Y., temperature regulators and steam traps; SHERWIN-WILLIAMS CO., Cleveland, Ohio, vulcanization accelerators; SOLVAY-PROCESS CO., Syracuse, N. Y., alkali products and by-products; W. S. TYLER CO., Cleveland, Ohio, sifting machinery; UNION SULPHUR CO., New York, N. Y., sulphur; VOLAND & SONS, INC., New Rochelle, New York, balances; WILL CORPORATION, Rochester, N. Y., laboratory supplies.

RUBBER TRADE INQUIRIES

THE inquiries that follow have already been answered; nevertheless they are of interest not only in showing the needs of the trade, but because of the possibility that additional information may be furnished by those who read them. The Editor is therefore glad to have those interested communicate with him.

(908) Inquiry is made for the address of the manufacturer of asphaltum "Jettolene."

(909) A reader desires the address of a manufacturer of cotton flock.

(910) A manufacturer requests the address of the manufacturer of a machine similar to the Falkenau-Sinclair fabric-testing machine.

(911) An inquiry has been received for the addresses of manufacturers of an inexpensive grade of Canton flannel.

(912) Inquiry is made for addresses of manufacturers of rubber cement of the kind used for setting bristles in rubber-set brushes.

(913) Information is requested as to literature giving practical information on all branches of tire repairing.

(914) A reader desires the addresses of manufacturers of waterproof colors for decorating white rubber or rubberized fabric by hand.

(915) A manufacturer requests the address of the maker of a rubber cement that will adhere to rubber and varnished, painted, or plain wood, or enameled cork.

(916) A reader wishes information as to how the color printing is done on golf balls.

(917) The address of the manufacturer of the Bonner inner tube is requested.

TRADE OPPORTUNITIES FROM CONSULAR REPORTS

Addresses may be obtained from the Bureau of Foreign and Domestic Commerce, Washington, D. C., or from the following district or cooperative offices. Requests for each address should be on a separate sheet and state number.

DISTRICT OFFICES.	COOPERATIVE OFFICES.
New York: 734 Customhouse.	Cleveland: Chamber of Commerce.
Boston: 1801 Customhouse.	Cincinnati: Chamber of Commerce; General Freight Agent, Southern Railway, 96 Ingalls Building.
Chicago: 504 Federal Building.	Dayton, Ohio: Dayton Chamber of Commerce.
St. Louis: 402 Third National Bank Building.	Los Angeles: Chamber of Commerce.
New Orleans: 1020 Hibernia Bank Building.	Philadelphia: Chamber of Commerce.
San Francisco: 307 Customhouse.	Portland, Oregon: Chamber of Commerce.
Seattle: 848 Henry Building.	

(35349) An American citizen with offices in Hungary desires to secure the representation of firms for the sale throughout all the Balkan States of automobile tires. Cash on delivery. Quote c. i. f. European port, preferably Trieste. Sample lines to be forwarded when possible, and catalogs, price lists, details as to terms, etc., in first letter.

(35362) A commercial agency in Jugoslavia desires to purchase or secure the representation of firms for the sale of the best quality pneumatic tires for pleasure cars and light-duty trucks. Quote c. i. f. Trieste or f. o. b. New York. Cash against documents United States currency. If goods are shipped on consignment, 100 sets of cases and tubes can be handled as initial order.

(35363) A firm of commission agents in Chile desires the representation of manufacturers of mechanical rubber goods, druggists' rubber sundries, rubber fabrics, hose and footwear.

(2) A firm of stationery supply dealers in the Dutch East Indies desires to purchase fountain pens and rubber erasers. Quote c. i. f. Belawan. Payment against documents.

(33) A printer in Chile desires to purchase from manufacturers rubber stamps, including letters, daters, and other supplies. Catalogs requested. Correspondence Spanish.

(48) A commercial agent in the Netherlands desires to secure an agency for the sale of rubber goods, rubber tires, etc. Quote c. i. f. Rotterdam, or Amsterdam.

The following trade list regarding dealers in motor cars, accessories, and tires in Martinique, West Indies, Ref. No. LA—35001, can be procured from the offices of the Bureau of Foreign and Domestic Commerce.

NATIONAL TIRE DEALERS' ASSOCIATION TO HOLD FIRST ANNUAL CONVENTION

FROM October 18-20, inclusive, the first annual convention of the National Tire Dealers' Association will be held at Cleveland, Ohio. Attempts are being made to make the occasion a worth-while one, and every tire dealer in the country, whether a member or not, is invited to participate. Every dealer attending the convention is also entitled to a half-fare certificate, as special arrangements have been made with the railroads.

The tire show, which will be one of the leading features, is the first exhibit of the kind yet attempted. A part of the program includes spending a day at Akron, in order to inspect that city's tire factories. For further particulars address Philip O. Deitsch, secretary, 642 Engineers Building, Cleveland, Ohio.

ASSOCIATION NOTES

The National Tire Dealers' Association, whose slogan is "Progress and Conservatism," reports the growth in many cities of various local associations that will, in due time, become affiliated with the national body. Among these prospective auxiliaries should be mentioned the Tire & Accessory Dealers' Association, Washington, D. C. Especially active among the affiliated organizations is the Baltimore Association, which agrees to organize cities within a radius of 100 miles of its district. Officers and directors of the National Tire Dealers' Association are: Thomas F. Whitehead, president; R. F. Valentine, vice-president; Philip O. Deitsch, secretary; H. O. Stenzel, treasurer. Directors include: R. R. Wooley, R. J. Walters, H. P. Farley, E. J. Methudy and A. B. Clark.

At a meeting of the Louisville Tire Dealers' Association, on July 30, the following officers and directors were elected for a period of one year: E. S. Howard, president; Ben Schulman, vice-president; M. Segal, secretary and treasurer. As directors: William Mohlenkamp, John D. Rommel and R. H. Rivers. The Louisville association is another auxiliary which aims to forward the interests of the National Association.

John W. Matheny was recently appointed secretary of the Cleveland Retail Tire Dealers' Association, an active branch of the national body. Mr. Matheny has had much experience in organization work.

THE VALENTINE SMITH CO., PASADENA, CALIFORNIA, HAS applied for a patent on a cord fabric inner tube which it has begun to market, in 32 by 3½ size. The tube consists of three plies of rubber-insulated cord fabric with a heavy layer inside and outside of high quality black tube gum. Exceptional durability is claimed for the tube, which is also said to be quite puncture proof.

New Machines and Appliances

INTERLOCKING SECTIONAL BUFFING WHEEL

An interlocking sectional buffing wheel is shown in the illustration. This is specially designed for the use of tire and rubber manufacturers as an efficient labor-saving tool.

"INTERLOX" BUFFING WHEEL SECTION

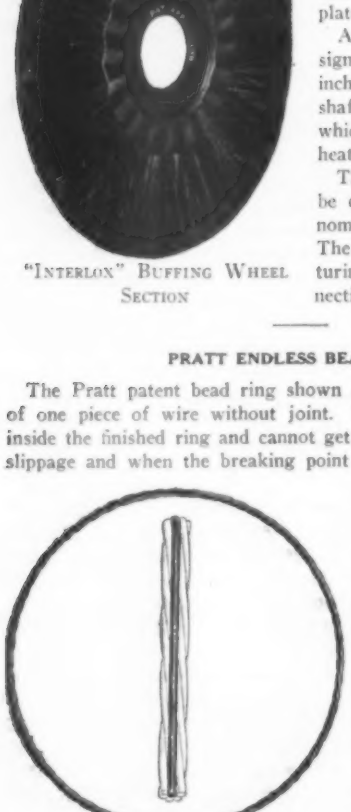
The design of the wheel comprises a series of sections each centered between light interlocking plates. These sections are to be mounted directly on the spindle of any buffing stand and held on by the regular plates.

A special feature of the design is an air space about three inches in diameter around the shaft between each section which aids in eliminating the heat generated in buffing.

This type of wheel is said to be especially efficient and economical for tire repair work.—The North Eastern Manufacturing Co., New Haven, Connecticut.

PRATT ENDLESS BEAD CORE

The Pratt patent bead ring shown in the illustration is made of one piece of wire without joint. The ends of the wire are inside the finished ring and cannot get out of place. There is no slippage and when the breaking point is reached on testing machines all the strands give way at once. Since the tensile strength of the wire used is a known factor the rings are sized on expanding machines up to 75 per cent of the known breaking point without danger of over-straining. All stretch is thus removed and the rings are true to size.



BEAD CABLE RING

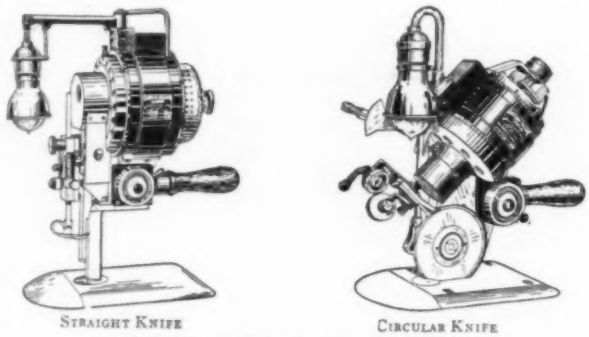
These bead rings are used in two different ways: (1) The rings are treated with rubber cement, dried and covered with rubber strip 1/16-inch thick, followed by a layer of bias-cut frictioned fabric; (2) The cemented ring is covered with bias-cut, skim-coated fabric and the wrapped ring is placed on the bead form. Narrow strips of rubber are then placed along the top and bottom of the ring and the flaps of the strip of skim-coated fabric first laid on the bead form are snugly folded up from the bottom and down from the top, thus giving the raw bead a somewhat triangular form suitable for placing in the bead mold for semi-curing.—National-Standard Co., Niles, Michigan.

ELECTRIC CUTTING MACHINES

The illustration shown at the left represents the latest type of straight-knife machine for cutting heavy layers of rubberized goods for clothing manufacture. It is built with a motor generating up to one horse-power, equipped with patented device for lubricating the knife and is designed to insure highest cutting speed.

The cutter is also fitted with many refinements including the quick detachable presser foot which may be removed quickly by pulling back a thumb latch, enabling the operator to sharpen the knife without resetting the presser foot.

The right hand illustration pictures a similar cutting machine with a circular knife for cutting straight lines and easy curves on soft rubber sheets. The knife may be sharpened while working, by a lever arranged to give the edge of the knife contact with a set of emery wheels. The machine embodies a lubricating device for supplying water to the knife when used for cutting rubber. These machines are made with either 110 or 220-volt, direct or alternating current motors.—The Eastman Machine Co., Buffalo, New York.

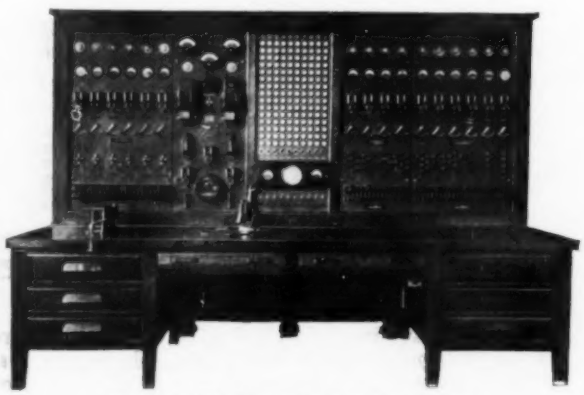


STRAIGHT KNIFE CIRCULAR KNIFE

EASTMAN RUBBER CUTTING MACHINES

FIRE AND WATCHMAN SYSTEM

The recently-installed fire and watchman system, at the Kelly-Springfield Tire & Rubber Company's plant, at Cumberland, Maryland, is an important part of this great factory, where the buildings cover 12 acres, and there are 22 acres of floor space.



FACTORY WATCHMAN'S CONTROL BOARD

The watchman's control board illustrated, said to be the largest in the country, is the heart of a complete fire and watchman's system, which safeguards the plant twenty-four hours each day. From this board as a center, signals, whether for clearing

the floor in any part of the building, for fire drills, or for stopping work through the whole or any part of the factory, can be operated. A fire box pulled in any part of the building connects with a large, electrically-operated steam whistle, which acts automatically.

The watchman's signals are an interesting feature of this new equipment. By means of a sequence of lamp signals the head watchman at his desk can note the progress of his assistants from station to station, while there are also excellent telephone connections. Dial records kept by the general manager are another means of knowing the number of stations visited.

The entire system, including wiring, circuits, fire and watchmen's boxes and stations, was designed and manufactured by the Holtzer-Cabot Electric Co., 115-135 Amory street, Roxbury, Boston, Massachusetts.

MACHINE FOR APPLYING RUBBER BINDING

In the manufacture of bathing caps, bindings and trimmings of sheet rubber are applied by means of crimping the stock together. The special machine shown in the illustration has no stitching mechanism, being especially designed for folding and crimping the raw edges of fabrics, at one operation. The crimping takes up the fullness around the edges of the material when formed in curves, adapting the machine for various sorts of work, including rubber binding as applied to rubber bathing cap manufacture.

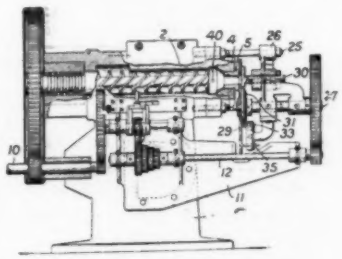
RUBBER CRIMPING AND BINDING MACHINE

The crimping is accomplished by a crimping pinion located above the work and a corrugated crimping wheel below the work. When the crimping pinion is lowered upon the work, pressure on the pinion is exerted by means of a spring and the folded edge of the material is crimped as it is fed through the machine.—Singer Sewing Machine Co., Singer Building, New York, N. Y.

MACHINERY PATENTS

MOLD BLANK FORMING MACHINE

A MODIFIED form of tubing machine designed to produce blanks of rubber for vulcanizing is shown in the illustration. The blanks are formed in apertures in plate 29, which rotates so that the apertures register successively with the die or nozzle 5 of a tubing machine. The back of the aperture in register with the nozzle is closed by the head of a screwed stop 30 in sliding engagement with plate 29. The tubing machine is provided with a by-pass outlet, 40, to relieve the pressure between two successive plate apertures.



TUBER FOR MOLDING BLANKS

The blanks are removed from the mold apertures by a star-wheel driven by means of bevel gearing connected with shaft 27. The mold plate is detachable so that plates with different sizes or shapes of mold aperture may be used.—A. Mond, London, England (The Miller Rubber Co., Akron, Ohio), British patent No. 160,268.

OTHER MACHINERY PATENTS

THE UNITED STATES

NO. 1,385,077 Roll grinder. S. Hansen, Brooklyn, N. Y., assignor to Birmingham Iron Foundry, Derby, Conn.
1,385,086 Holder for rubber heel washers. H. F. Maranville, assignor to the Firestone Tire & Rubber Co.—both of Akron, O.
1,385,333 Machine for engraving molds. A. A. Bush and R. H. Freitag, assignors to the Firestone Tire & Rubber Co.—all of Akron, O.
1,385,518 Tube repair vulcanizer. M. Boylan, Omaha, Nebr.
1,385,975 Tire finishing mechanism. M. A. Replogle, assignor to The Goodyear Tire & Rubber Co.—both of Akron, O.
1,386,465 Tire vulcanizing method and apparatus. J. R. Gammeter, Akron, O., assignor to The B. F. Goodrich Co., New York, N. Y.
1,386,512 Tire mold. H. M. Lambert, Portland, Oreg.
1,386,513 Solid tire mold. H. M. Lambert, Portland, Oreg.
1,386,514 Solid tire mold. H. M. Lambert, Portland, Oreg.
1,386,579 Valve operating mechanism. A. G. Maranville, assignor to The Goodyear Tire & Rubber Co.—both of Akron, O.
1,386,603 Vulcanizing press. R. H. Crumlich, Erie, Pa.
1,386,644 Machine for removing cores from casings. N. Y. Momitsa, Crestline, O.
1,387,616 Apparatus for making pneumatic inner tubes. F. T. Roberts, Cleveland, O., assignor to Paramount Rubber Consolidated, Inc., Philadelphia, Pa.
1,387,617 Apparatus for making hollow rubber articles. W. E. Roberts, Andover, Mass., assignor to Paramount Rubber Consolidated, Inc., Philadelphia, Pa.
1,387,763 Machine for lasting rubber-sole footwear. L. A. Casgrain, Beverly, Mass., assignor to United Shoe Machinery Corporation, Paterson, N. J.
1,387,769 Molding apparatus. F. B. Davis, Erie, Pa.
1,387,964 Surface coating machine. S. W. Bourn, Providence, R. I.
1,388,032 Burner for repair vulcanizers. W. Frost, assignor to Harvey Frost & Co., Limited—both of London, Eng.
1,388,125 Apparatus for making hollow rubber articles. F. T. Roberts, Cleveland, O., assignor, by mesne assignments, to Paramount Rubber Consolidated, Inc., Philadelphia, Pa.

THE DOMINION OF CANADA

212,374 Tire building machine. The Firestone Tire & Rubber Co., assignee of W. C. Stevens—both of Akron, O., U. S. A.
212,377 Selvage trimmer. The Goodyear Tire & Rubber Co., assignee of R. S. Trogner—both of Akron, O., U. S. A.
212,452 Method of curing and shaping articles of rubberized fabric. The Canadian Consolidated Rubber Co., Limited, Montreal, Que., assignee of F. A. Brown, Indianapolis, Ind., U. S. A.
212,466 Golf ball winding machine. The B. F. Goodrich Co., New York, N. Y., assignee of E. L. Schick, Cuyahoga Falls, O.—both in U. S. A.
212,562 Machine for beveling ends of solid rubber tires. The Dunlop Rubber Co., Limited, Westminster, London, assignee of C. Macbeth and W. E. Hardeman, both of Birmingham—all in London, England.
212,658 Tubular fabric cutting machine. A. C. Bunker, Montclair, N. J., U. S. A.
212,689 Repair vulcanizer. The Williams Foundry & Machine Co., assignee of J. W. Arthur—both of Akron, O., U. S. A.
212,752 Tubing machine. The Canadian Consolidated Rubber Co., Limited, Montreal, Que., assignee of W. E. Stewart, Providence, R. I., U. S. A.
212,758 Forming inner tubes. The Goodyear Tire & Rubber Co., Akron, O., assignee of W. C. Tyler, Racine, Wis.—both in U. S. A.
212,759 Removing tires from cores. The Goodyear Tire & Rubber Co., assignee of R. B. Day—both of Akron, O., U. S. A.
212,760 Building pneumatic tires. The Goodyear Tire & Rubber Co., Akron, O., assignee of B. Darrow, Los Angeles, Calif.—both in U. S. A.

THE UNITED KINGDOM

164,787 Tire bead trimmer. Dunlop Rubber Co., Limited, 1 Albany street, Regents Park, London, and C. Macbeth, and F. Fellowes, of Dunlop Rubber Co., Limited Works, Fort Dunlop, Erdington, Birmingham.
164,791 Stripping solid tires. R. B. Helliwell, Ditton Road, Widnes, Lancashire.
165,459 Sectional tire mold. J. A. Swinehart, 136 Adolph avenue, Akron, O., U. S. A.

GERMANY

PATENTS ISSUED WITH DATES OF ISSUE

341,309 (April 11, 1920) Press form for the manufacture of rubber saddle covers. James Jelly, Coventry, and Henry Jelly, Birmingham, England; represented by Dr. A. Levy and Dr. F. Heinemann, Berlin, S. W. 11.

DESIGN PATENTS ISSUED WITH DATES OF ISSUE

784,592 (May 26, 1921) Attaching rubber tires to wheels of baby carriages and the like. Wolfgang Richard Gebauer, Krimmitschau.
785,383 (June 19, 1920) Tire tool. The Dunlop Rubber Co., Limited, London, England; represented by R. H. Korn, Berlin, S. W. 11.
785,808 (June 22, 1920) Tool for opening tire mold. The Dunlop Rubber Co., Limited, London, England; represented by R. H. Korn, Berlin, S. W. 11.
785,868 (June 27, 1921) Mold for rubber heels. Max Götze, Steuerwalderstrasse 20, Hildesheim.

PROCESS PATENTS

THE UNITED STATES

NO. 1,385,079 Method of removing tires from rims. R. R. Jones, assignor to The Firestone Tire & Rubber Co.—both of Akron, O.
1,385,220 Tube splicing. M. A. Marquette, assignor to The Fisk Rubber Co.—both of Chicopee Falls, Mass.

1,387,381 Tire vulcanizing method and apparatus. J. R. Gammeter, Akron, O., assignor to The B. F. Goodrich Co., New York, N. Y.

1,387,805 Process of making rubber articles having cores and apparatus therefor. F. T. Roberts, Cleveland Heights, O., assignor to Paramount Rubber Consolidated, Inc., Philadelphia, Pa.

1,387,963 Method of applying a coating fluid. S. W. Bourn, Providence, R. I.

1,388,123 Method of making hollow rubber articles. F. T. Roberts, Cleveland, O., assignor by mesne assignments, to Paramount Rubber Consolidated, Inc., Philadelphia, Pa.

1,388,124 Process of and apparatus for making hollow rubber articles. F. T. Roberts, Cleveland Heights, O., assignor, by mesne assignments, to Paramount Rubber Consolidated, Inc., Philadelphia, Pa.

1,388,138 Method of and apparatus for vulcanizing. R. H. Atcheson, Providence, R. I., assignor to Ibex Rubber Corporation, Jersey City, N. J.

SAFETY STEPPING TOOL FOR REPAIRMEN

A self-sharpening safety hand tool for stepping out plies in tire repairing is here shown. The blade is adjustable in the holder by means of a set screw and is made with a flat runner at the bottom. This arrangement makes the knife virtually a plow which cuts and turns the first ply of fabric and determines the depth of the cut. The instrument is not a push knife but a draw knife It affords a clear view of the work and on clincher tires enables the operator to cut completely around the bead.—H. J. Otto, Evansville, Indiana.

FABRIC STEPPING TOOL

MECHANICAL AND ELECTRICAL POWER RESEARCH LABORATORY

MODERN facilities for measuring power requirements in rubber mill practice have been installed in the mechanical and electrical research laboratory recently organized by William R. Thropp & Sons Co., Trenton, New Jersey. The installation comprises actual full-size rubber working machines equipped with the latest patented mechanical devices of the Thropp company.

The machinery equipment includes a mixing mill 16 by 42 inches provided with roller bearings, saving about 30 per cent in power over plain bearings. The rolls are constructed to

RESEARCH LABORATORY OF WILLIAM R. THROPP & SONS CO., TRENTON, NEW JERSEY

permit rapid change of surface temperature. Connected with the mill is a kilowatt-hour meter and a kilowatt meter for testing horse-power.

The mill is also equipped with three different approved types of safety stops, namely: (1) dynamic braking; (2) mechanical and electrical stops; (3) differential and electric clutch. The mill has also a balanced bar control operated from either side of the machine. The differential electric clutch on the motor drive will transmit 75 horse-power.

In addition to the mill there is a 24 by 24-inch hydraulic press completely equipped with slip joints, manifolds, and patent swing tables. The latter reduces labor costs by half and allows the use of a double set of molds. The press is operated by a special Davidson pump working at 2,000 pounds pressure.

Rubber manufacturers are invited to utilize these facilities, without charge, to determine power cost factors for milling, mixing and warming-up their stock batches, and for press work.

TIRE PRODUCTION FOR THE FIRST SIX MONTHS OF 1921

AMERICAN rubber factories produced 8,750,000 pneumatic tires during the first six months of the present year, according to figures compiled by The Rubber Association of America and published by the Department of Commerce. Stocks on hand have decreased from 5,508,000 in December of last year to 4,154,000 at the end of June. The stocks on hand are a little more than one tire for each two cars now in operation.

At the beginning of the year The Rubber Association stated that tire stocks were lower than at any previous time, and 2,000,000 below the normal supply. This shortage has been increased to 3,300,000. Tire production during the past six months has consistently increased. The low mark was reached in November of last year, when only 506,000 were manufactured. In January, 703,000 tires were made, and in June, production had increased to 2,313,000.

Solid tire production has not increased as rapidly as that of the pneumatic tires. Stocks did not decrease with the same rapidity. In January a total of 16,000 solid tires was made and stocks amounted to 303,000. In June, 240,000 remained in stock and 28,000 were manufactured.

In the manufacture of all these tires more than 34,000,000 pounds of fabric and 88,000,000 pounds of crude rubber were consumed.

These figures bear out the statements published in THE INDIA RUBBER WORLD at the end of the first half of the year that Akron produced only 6,000,000 tires during the period and that the country as a whole was facing an actual shortage of tires. It also bears out the prediction on the part of Akron manufacturers that the coming winter will probably be much better than last.

The following table gives the stocks of tires on hand, solid tire production, fabric and crude rubber consumption for the last two months of 1920 and the first six months of 1921:

1920	Casings Stocks	Solids Manufactured	Fabric Consumed Pounds	Rubber Consumed Pounds
November	5,880,000	21,000	1,800,000	6,563,000
December	5,508,000	16,000	1,649,000	4,259,000
1921				
January	5,319,000	21,000	2,598,000	6,625,000
February	5,193,000	23,000	2,952,000	7,823,000
March	4,597,000	28,000	4,474,000	12,075,000
April	4,527,000	28,000	6,524,000	17,191,000
May	4,451,000	35,000	7,863,000	21,050,000
June	4,154,000	28,000	8,044,000	21,207,000

BUTTONS AND NOVELTIES OF GALALITH

Galalith, although similar in appearance to pyroxylin, is in composition really quite different, being casein treated with acetic or sulphuric acid kneaded in a bath of hot water until uniform in texture, after which it is dried in rods and sheets. It is then ready for use in the manufacture of numerous articles, a few of which are: buttons, combs, brushes, cigar and cigarette holders, cane and umbrella handles, beads, bag frames, watch fobs, necklaces, belt ornaments, lavallières, etc., the different articles being made in various shades and colors. As an example of the beauty of galalith, the most exquisite hand-carved jade or onyx ornaments imitated in this material can be detected only by the eye of an expert. In its natural state galalith is of a color similar to ivory or horn. When treated, it takes any deep rich color, holding it permanently. It takes a bright and lasting polish and is non-combustible and practically non-breakable as well.

New Goods and Specialties

LET THE "SUPER GOLF BAG" INSURE YOUR BELONGINGS

THE devotees of golf will welcome this new "Super" golf bag with patent closing that can be locked and so prevent theft of any of the contents. The picture shows only the hood at the top of the bag but the bag itself closes with the same patent fastener which moves along smoothly in the grooved edges and is provided with a loop into which a padlock can be slipped. The same padlock fastens into the loops of the fasteners of both the hood and the bag proper, over the leather band. Certain models have an extra pocket for golf balls, which also locks in the same way.

"SUPER" GOLF-BAG HOOD WITH PATENT CLOSING

The "Super" golf bag is light in weight, made of double-texture waterproofed whipcord fabric, over a steel and rawhide frame, and the actual weight is less than four pounds. It is roomy enough to contain a complete outfit for golfing, including clothes and shoes.—Allied Golf Co., 804 Washington Boulevard, Chicago, Illinois.

DURABLE "SILONITE" POKER CHIPS

"Silonite" poker chips contain rubber in their composition and are manufactured for distributers to the trade. They are unaffected by moisture or climatic changes, it is claimed, and retain their shape indefinitely. They are uniform in thickness, insuring perfect stacking, and come boxed in assorted colors including 50 white and 25 each of red and blue.—Goodyear's India Rubber Glove Manufacturing Co., 503 Broadway, New York, New York.

THREE IMPROVEMENTS FOR THE MOTORCYCLE

ROBERTS HANDLE AND KNEE PAD

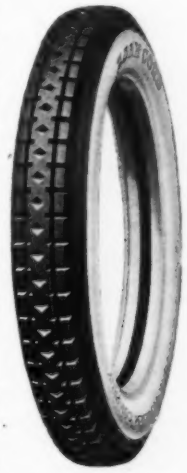
The Roberts handle grips for motor cycles are made of high quality black rubber, and as they are pneumatics, effectively absorb all vibration, thus increasing comfort in riding. For additional comfort the knee grip has been offered, made of a special waterproof fibro-rubber material, designed to fit the shape of the knee, and is much more comfortable than [illegible] yielding leather. The same company also offers a molded complete saddle top, embedding the back plate and nose plate in the special fibrous rubber substance, and making a saddle which is rivetless, waterproof and incomparably more resilient and durable than leather. Also, this saddle will not stretch or lose its shape.—Alfred Roberts & Sons, Limited, Deykins Avenue, Witton, Birmingham, England.

BATHERS FITTED OUT IN THE 5-AND-10-CENT STORE

City shoppers on a hot day who suddenly become seized with the desire to go to one of the beaches, can fit themselves out with rubber caps, garters, and rubberized bathing-suit bags at the 5-and-10-cent store. The caps are simple diving caps in red, blue and green rubber, as well as gray or black, and the bathing-suit bags are large enough to hold comfortably bathing-suits of the size preferred today. The rubber garters are reminiscent of kelp with their daintily fluted edges. They are sold in navy blue and black and are made of good quality rubber sheeting cut in strips, shirred and cemented to a straight strip of narrower width.—I. B. Kleinert Rubber Co., 719 Broadway, New York, N. Y.

BLACK TREAD CORD TIRE

The manufacturer of the "Ajax" tire has recently put on the market one with new features. One of these is the heavy black tread, built out to form an almost flat contact surface with the road. The well-known Ajax "cleats" are also featured in this tread, while sharp, deep, parallel grooves running around the tire furnish means for resisting side slipping. There is, besides, an indented grip spot in the center of each cleat, which provides an additional safety factor. National advertising of this tire is resulting in satisfactory returns, it is said, to both manufacturer and dealer.—Ajax Rubber Co., Inc., 220 West 57th street, New York, New York.



NEW "AJAX" CORD

THE "MORRISON" FOUNTAIN PEN

One of the newer fountain pens recently put on the market is the "Morrison," which has a durable ink-sac to resist reasonably hard usage and a hard rubber barrel with self-filling pressure lever inserted in one side. The barrels for these pens are made by the American Hard Rubber Co., 11 Mercer street, New York, and the pen retails somewhat less expensively than other similar ones.—Morrison Fountain Pen Co., 1547 Broadway, New York, New York.

EVERY CHILD ON RUBBER TIRES

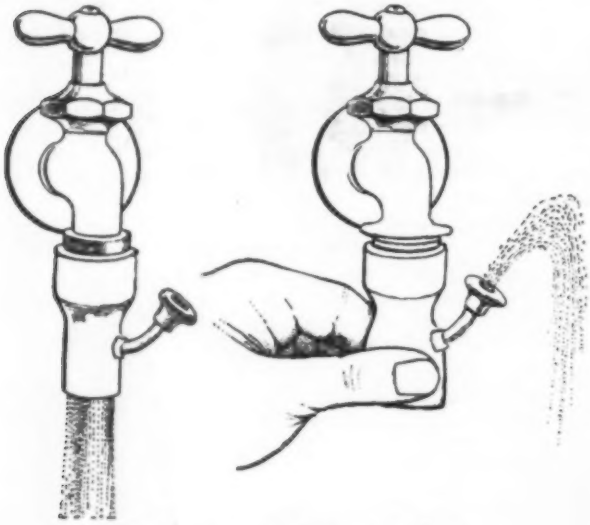
From the variety of coasters, cars, express wagons, and other small rubber-tired vehicles built for Young America, it would seem that all the manufacturers had adopted as their slogan, "Every child on rubber tires." But probably the growing popularity of disk wheels on adult automobiles explains why some of these juvenile conveyances have them, too, and the rubber tires quite naturally accompany them.

THE "KELLEY KAR"

The "Kelley Kar" represented here has a 10-inch disk wheel of solid steel, equipped with ball bearings, and a nickeled hub cap. The solid rubber tires built up like a regular automobile tire are furnished only when specially ordered. They are easily replaced simply by stretching the new ones over the edge of the wheel.—Burnham Manufacturing Co., Charles City, Iowa.

FILTERING AT THE FAUCET

Every householder, as well as the bachelor maid and man, can now have, on any ordinary water faucet, a combined sanitary drinking fountain and filter, made of rubber, which simply fits



"EVER-READY" FAUCET FOUNTAIN AND FILTER

over the end of either a screw-threaded or plain faucet. When not desired as a fountain, the water filters through the device in a straight stream. When the fountain is desired, it is only necessary to press together the bottom part. This forces the water up through the side opening and makes the drinking fountain. This side opening can also be used for washing bottles. As a saver of glassware and a convenience that is "Ever-Ready," as its name implies, this device should find a welcome in every home.—F. P. Williams Manufacturing Co., 213 State street, Detroit, Michigan.

WATERPROOF MANUFACTURERS IMPROVE MACKINTOSH STYLES

It is difficult to obtain in mackintoshes the style and dressy appearance of a lady's first class tailor-made garment, yet English waterproof manufacturers this year are offering coats which are smart and most becoming. One of the garments which is a departure from last year's styles is of striped cashmere. The stripes are woven with the fabric, or printed thereon. Another particularly attractive model is a lady's double-breasted coat of fine soft black cashmere with a thin woven stripe. This coat is practically indistinguishable from a tailor-made coat.—*The India-Rubber Journal.*

AN AIRLESS NON-PUNCTURING TIRE

This is a tubeless cushion tire of high resiliency, composed wholly of rubber and fabric, and with a small central cavity to further increase easy riding. The tread and outer walls are composed of extremely tough and wear-resisting rubber, and the interior consists of highly resilient red rubber, reinforced by layers of fabric. The tire looks exactly like a pneumatic on the wheel, and is interchangeable with any pneumatic on the same rim. The average service mileage is between 25,000 and 30,000 with no trouble, care or repair.—Liberty Airless Tire Corporation, Carey, Ohio.

LIBERTY AIRLESS TIRE

TO LIGHT THE HUNTER ON HIS WAY

The simplicity of operation and inexpensiveness of maintenance of the acetylene lamp recommended it to those who require a lamp that needs little attention but which will burn continuously and give adequate light.

"JUSTRITE" HUNTER'S LAMP

The "Justrite" is such a lamp, made for the hunter. It has a self-lighting attachment so that no matches are required, and it will not blow out. It burns ten hours on one charge of carbide and water and the manufacturer claims its penetrating brilliant light will pierce fog and mist.

The outfit shown here attached to a suitable cap which is not furnished, includes the generator, head lamp, rubber hose, and belt for attaching. The generator is positioned at the small of the back when worn.—Justrite Manufacturing Co., 2065 Southport avenue, Chicago, Illinois.

"PANTHER SCOOP" HEEL

NEW RUBBER HEELS

The "Panther Scoop" heel is made of high-grade rubber and has a special "scoop" formation on the under side that gives it the ability to cling to the shoe by suction after it is nailed in place.

"SURE STEP PANTHER TREAD"

The "Sure Step Panther Tread" heel shown here is made in black, tan, and white to fit women's French heels and runs in sizes from 1 to 6. The under side is concaved to assure the proper fit when applied. —Panther Rubber Manufacturing Co., Stoughton, Massachusetts; Panther Rubber Co., Limited, Sherbrooke, Quebec, Canada.

"COLUMBUS" CORD TIRE

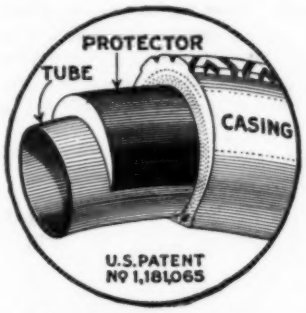
ANOTHER OHIO CORD

Ohio might as well be called the mother of tires as of presidents. The accompanying picture shows one of her newer cord tires built by hand, and cured over an air-bag. Cord fabric made from combed Egyptian cotton is used in making this tire, which is oversize and guaranteed to run 10,000 miles.

The same manufacturer also makes a fabric tire from 17½-ounce combed Egyptian fabric, which is guaranteed for 8,000 miles. These guaranties are intended as the minimum of service expected from these tires.—The Columbus Tire & Rubber Co., 555 West Goodale street, Columbus, Ohio.

PROTECT NEW TIRES AS WELL AS OLD ONES

Perhaps it is a new idea to provide a tire protector for new tires before they become old ones, but that is the object of the invention described here, recently put on the market. It is made of live rubber, without fabric, and is inserted inside the casing between that and the inner tube. It is made longer than the inside diameter of the tire so that it must be crowded into position and made to fit snugly without creeping.



"Coffield" Tire Protector

When a tire thus interlined hits a stone, curb, or other obstruction, the shock of the blow is distributed throughout a larger area, it is claimed, and does not weaken the tire at one particular point which may later result in a blow-out. A short nail cannot reach through this protector, and the rubber of which it is made is vulcanized to such a degree that it turns and clinches longer nails picked up. It is not claimed that this protector is entirely puncture-proof but that in many cases it does prevent serious damage to new tires thus equipped.—The Coffield Tire Protector Co., Dayton, Ohio.

NEW DESIGN FOR BASKET-BALL SHOES

A new type of shoe, designed for basket-ball players, appears to have qualities which should make it popular. The upper, cut from specially-prepared leather, is so planned as to give support to the wearer's ankles, while the whole is lighter in weight than the ordinary basket-ball shoe, it is claimed.

Basket-Ball "Moreshu"

The especial feature of this "Moreshu," however, is the thick rubber sole which grips the floor and gives the wearer a sense of security. This type of shoe is being used by many professional basket-ball players.—Walter H. More Co., 258 Broadway, New York, New York.

COMFORTABLE SLIPPER WITH ELASTIC INSERT

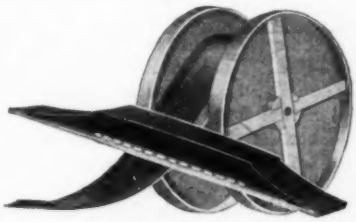
The general unsatisfactoriness of house slippers that have become stretched and no longer fit is sometimes a factor in preventing purchases which would otherwise be made and result in added home comfort.


Corson "Comfort" Slipper

The "Comfort" slipper pictured here has an elastic insert in each side which insures a snug fit after the slipper is on the foot. This Canadian slipper has a low heel and flexible welt. It is made in royal purple and black calfskin, in brown and black kid, cabrettas, and moroccos, with silk elastic goring made by a process patented in 1918, and is repairable.—The Corson Shoe Manufacturing Co., Limited, 100 Sterling road, Toronto, Canada.

CONVENIENT RETREAD STOCK

The "All-in-One" retreads are said to save both labor and material. The tread, cushion and breaker are all in one; therefore, vulcanizing and retreading can be done with the same materials prepared in the same way as those used in manufacturing the General cord tire.


"All-in-One" Retread Stock

The "All-in-One" retreads come in four standard widths of 3½, 4½, 6 and 9½ inches, and each on 25-pound reels. Buying one repair stock instead of four, and having a material that is all ready to be applied, is a decided improvement in tire-repairing methods.—The General Tire & Rubber Co., Akron, Ohio.

AUTOMOBILE COASTER WITH RUBBER TIRES

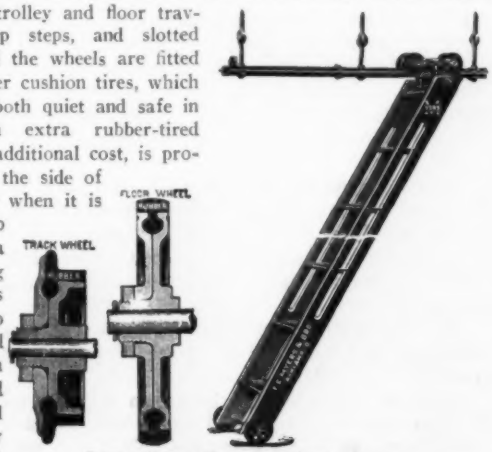
A wheel which lends itself readily to use on baby carriages, children's play cars and automobiles, is the one shown herewith. It is of pressed steel, in two pieces. The rim, spokes and interlocking lips are made in one and are clamped together.

Rubber-Tired Pressed Steel Wheels

The spokes are of convex design which gives greater strength and adds a fine appearance to the wheel surface. It also permits more effective painting or enameling than is possible on a wire or wooden spoke. One of the most interesting features of the wheel is the solid rubber tire which can be supplied in various sizes to meet the manufacturer's requirements.—L. C. Chase & Co., 89 Franklin street, Boston, Massachusetts.

STORE LADDER EQUIPPED WITH CUSHION TIRES

A practical and convenient ladder for reaching merchandise on high shelves in stores is shown here. It is equipped with tandem overhead trolley and floor travelers, deep steps, and slotted sides. All the wheels are fitted with rubber cushion tires, which makes it both quiet and safe in use. An extra rubber-tired roller, at additional cost, is provided for the side of the ladder when it is installed to run on a slanting floor. This ladder is so constructed that it can be mounted easily and safely without using the hands, thus leaving them free to carry merchandise. It is claimed that this ladder is free from the vibrating motion sometimes noticeable in similar ladders.—F. E. Myers & Brother, Ashland, Ohio.



Rubber-Tired Wheels on Store Ladder

COLONEL COLT'S WILL

UNDER the will of Colonel Samuel P. Colt, chairman of the United States Rubber Co., who died August 13, 1921, $410,000 was left in public bequests. Other specific bequests to individuals aggregated $1,069,000, not including $1,000 left to each of some 275 employes of the Industrial Trust Co. and the Rhode Island Safe Deposit Co., Providence, Rhode Island, founded by Colonel Colt, and to each servant in his employ for six months or more.

Brown University, Providence, Rhode Island, is to receive $50,000, and the Massachusetts Institute of Technology, Cambridge, Massachusetts, of which Colonel Colt was a graduate, $10,000.

Bequests to the town of Bristol, Rhode Island, and to Bristol institutions total $300,000, and are all to be made in the stock of the Bristol & Warren Water Works Co., valued at par. These are: $100,000 to the town of Bristol, Rhode Island, in trust, the income to go to the maintenance of the Colt Memorial High School, built for the town by Colonel Colt; $50,000 to the town of Bristol, Rhode Island, in trust, the income to be used for the relief of the poor; $50,000 to St. Michael's Episcopal Church, Bristol, Rhode Island, of which Colonel Colt was a member; $25,000 each to the Bristol Home for Destitute Children, the Bristol Home for Aged Women and the Benjamin Church Home for Aged Men; $25,000 to the Juniper Hill Cemetery Corporation in trust, the income to be used for the care of the Colt burial lot.

Other public bequests are $25,000 to the town of Warren, Rhode Island, in trust, the income to be used for the relief of the poor, and $25,000 to the town of Barrington, Rhode Island, in trust, the income to be devoted to the same purpose. Both bequests are to be paid in the stock of the Bristol & Warren Water Works Co.

Senator Le Baron B. Colt, the Colonel's brother, and Russell G. Colt and Roswell C. Colt, his two sons, are to receive $100,000 each outright.

The following relatives are to receive $50,000 each outright: Edith Converse Colt, widow of his nephew, Le Baron C. Colt; Countess Eleanor Moroni, formerly of Montreal, Canada; each child of his nephew Le Baron C. Colt; each of his grandchildren, and each child of his brother, Senator Le Baron B. Colt.

The following are to receive $25,000 each: Minnie DeWolf Perry, Bristol, Rhode Island; Florence Bicknell, Malden, Massachusetts, and Ethel Barrymore Colt, wife of his son, Russell G. Colt.

The following relatives and friends are to receive $10,000 each: Mary Louise Colt, wife of Senator Le Baron B. Colt; two children of Norman Colt, son of his uncle, James B. Colt, Seattle, Washington; Isabella Colt DeWolf, his sister; Bradford DeWolf and Blanche DeWolf Levie, children of his sister; Reverend Dr. George L. Locke and Merton A. Chessman, both of Bristol, Rhode Island; Waldo M. Place, Providence, Rhode Island; John D. Carberry, Brooklyn, New York, and Calvin S. May, New York, N. Y.

As a slight remembrance, $1,000 each is given to each of the following friends: Nathaniel Meyers, Samuel Norris, Francis V. Glynn and Henry A. Van Dyck, all of New York, N. Y.; James W. Franklin and Andrew W. Anthony, of Bristol, Rhode Island; Edwin A. Barrows and Harold L. Gross, of Providence, Rhode Island.

The testator's estate at Mamaroneck, New York, is left to the son Russell G. Colt and his wife, Ethel Barrymore Colt, for their child or children.

After all specific bequests have been paid the residuary estate is to be divided into two equal parts. The income from one-half is to be applied to the upkeep of Colonel Colt's Bristol, Rhode Island, property, and to other purposes, and finally to be added to the other half. The Homestead Estate and Colt Farm are to be maintained free of rent and expense as places of residence for Colonel Colt's children and grandchildren, Russell G. Colt to have the first right to occupy the former, and Roswell C. Colt, the latter. Both places go to the last surviving grandchild in fee simple.

The second half of the residuary estate is to be divided into six equal parts, Senator Le Baron B. Colt, Russell G. Colt and Roswell C. Colt each to receive one part. The remainder is to constitute a trust fund, and the income is to be paid equally to these same beneficiaries, and, upon their decease, to their children, the principal to be made over to their grandchildren in fee simple.

Colonel Colt's wife, Elizabeth N. Colt, will continue to receive annuities provided by trust indentures in 1908 and 1909, and an agreement in 1912 releasing all right of dower in the estate.

The Industrial Trust Co., Providence, Rhode Island, is named as sole executor and trustee. The value of the estate has not yet been determined.

LESTER LELAND ON COLONEL COLT

Lester Leland, vice-chairman of the board of directors of the United States Rubber Co., commenting upon the death of Colonel Samuel P. Colt, said:

"Colonel Colt was remarkably well equipped for the position he held for so many years at the head of the United States Rubber Co. A well-grounded experience in law—a prominent career in finance, having created and built up one of the largest successful trust companies in New England—and coupled with this experience, a natural gift in handling business problems—it is not too much to say that he was, and in the future, will be, regarded as one of the greatest commercial leaders of his day."

THE OBITUARY RECORD

INVENTOR OF THE HUNTER DRY KILN

HARRY HUNTER, president of The Hunter Dry Kiln Co., Indianapolis, Indiana, died on board ship August 29, en route home from England where he had been attending the Fifth International Rubber Exposition in the interests of his company.

HARRY HUNTER

Mr. Hunter gained prominence in the rubber industry through the development of a method of drying and processing rubber, and his discoveries entirely revolutionized former methods of production. The many units of the Hunter system now in use are a testimonial to his efforts along these particular lines. Mr. Hunter was fifty-five years of age.

A VETERAN IN FOOTWEAR MANUFACTURE

Adna D. Warner, general manager of The Mishawaka Woolen Manufacturing Co., Mishawaka, Indiana, died recently at his home in that city. Mr. Warner, who was sixty-two years of age, had been associated for the greater part of his business career with The Goodyear Metallic Rubber Shoe Co., Naugatuck, Connecticut, and with the late George A. Lewis, who was at that time president and treasurer of this company.

Another of Mr. Warner's associates for many years was E. A. Saunders, formerly of Naugatuck, Connecticut, who later became owner of The Mishawaka Woolen Manufacturing Co. In company with Mr. Lewis and others Mr. Warner, in 1899 established The Beacon Falls Rubber Shoe Co., at Beacon Falls, Connecticut, and through their wise management both plants prospered under their direction.

Aside from his connection with the rubber industry Mr. Warner was president of the North Side Bank in Mishawaka

and a director of The Mishawaka Savings & Trust Co. He leaves a widow, an adopted son, and a step-daughter.

ASSISTANT TREASURER OF THE HOOD RUBBER CO.

Thomas H. Burton, assistant treasurer of the Hood Rubber Company, Watertown, Massachusetts, died August 22 in his fortieth year, after a short illness. Born in Boston and educated in the public schools of that city, he was for fifteen years connected with The State Street Trust Co., as assistant secretary. Three years ago he left that institution to accept the position which he held at the time of his death. Mr. Burton is survived by his widow and his mother.

PROMINENT LAWYER AND PHILANTHROPIST

Nathaniel Myers, at one time attorney for and one of the members of the advisory council of the United States Rubber Co., died in this city last August, in the seventy-third year of his age. With few early opportunities he realized the value of a good education and began the study of law while working as a telegraph messenger. Admitted to the bar when only 19 years of age, Mr. Myers came to New York and formed a partnership with Simon Stern. Later he became associated with Cortland B. Anable, the firm being known as Myers & Anable. Mr. Myers was president of the Hebrew Technical School for Girls and interested in the Federation of Jewish Philanthropic Societies, an organization which through his efforts was finally established, and now includes 91 societies.

NEW INCORPORATIONS

A. M. K. TIRE FLUID CO., August 17 (Massachusetts), $100,000. J. E. Salmon, 3 Hart's avenue; A. J. McKenzie, 140 Methuen street: F. J. Hubin, 135 Third street—all of Lowell, Massachusetts. Principal office, Lowell, Massachusetts. To manufacture and deal in automobile tires, tubes and automobile accessories.

Adirondack Tire Tube Co., September 10 (Massachusetts), $200,000. W. H. Barse, president; A. C. Kelley, vice-president; C. N. Burnell, treasurer and manager; F. P. Fleming, secretary—all of Springfield, Massachusetts. Principal office, 780 Worthington street, Springfield, Massachusetts. To manufacture an automobile tire tube called "Adirondack."

Ajax Tire Co., of Nashville, September 1 (Delaware), $2,000. E. M. Pope, vice-president and general manager. Principal office, Nashville, Tennessee. To distribute Ajax tires.

American Rubber Preserver Corporation, August 30 (Delaware), $500,000. T. L. Croteau; C. H. Blaske; S. E. Dill—all of Wilmington, Delaware. Delaware agent, Corporation Trust Co. of America, Du Pont Building, Wilmington, Delaware. To manufacture, buy and sell rubber tires, rubber cement, etc.

Amodio Sectional Auto-Tire Co., Inc., September 19 (New York), $50,000. G. Mingione; J. Schiano; R. Amodio—all of Rochester, New York. Principal office, Rochester, New York. To manufacture automobile tires.

Apex Tire & Rubber Co., July 19 (Rhode Island), 250 shares of common stock without par value. D. V. Smith; J. M. Franklin, both of Providence; C. H. Sprague, Arctic—both in Rhode Island. Principal office, Providence, Rhode Island. To manufacture tires, etc.

Armour Tire Corporation, September 1 (Delaware), $1,000,000. H. L. Ellis, Jr.; J. L. Cunningham; F. Fallon—all of 149 Broadway, New York City. Delaware agent, Charter Service Corporation, 206 West 9th street, Wilmington, Delaware. To manufacture and deal in tires.

Bell Tire & Rubber Co., September 9 (New York), $10,000. H. S. Eisenberg, president; H. W. Lefkowitz, vice-president; L. Kaplus, treasurer; J. M. Saunders, secretary. Principal office, 250 West 54th street, New York City. To manufacture, buy and sell tires and tubes.

Benjamin Products Corporation, September 1 (Delaware), $1,000,000. A. R. Oakley, Pearl River; W. E. Schiels, Jr., 153 Division avenue, Brooklyn—both in New York; R. A. Van Voorhis, 77 Oak street, Jersey City, New Jersey. Delaware agent, Registrar and Transfer Co., 100 West 10th street, Wilmington, Delaware. To deal in rubber and gutta percha and manufactures from same.

Brennan-Busch, inc., September 14 (New York), $5,000. J. M. Brennan, 119 Rosedale street; J. McSweeney, 162 Union street; F. W. Busch, 462 Court street—all of Rochester, New York. Principal office, Rochester, New York. To deal in automobile tires.

Carew & Sheehan, Inc., September 8 (New York), $1,000. A. E. Sheehan, president; M. M. Carew, vice-president and treasurer; W. K. Duprez, secretary. Principal office, 61 Whitehall street, New York City. To deal in crude rubber, etc.

Chicago Rubber Clothing Co., August 16 (New Jersey), $125,000. W. F. Brower; A. S. Behrend; F. L. Crane—all in Newark, New Jersey. Principal office, 44 Clinton street, Newark, New Jersey. Agent in charge, W. F. Brower. To manufacture rubber clothing, etc.

Coughlin Manufacturing Co., May 25 (New York), $5,000. F. D. Zahn; E. Herrman; R. Lader—all of 522 Fifth avenue, New York City. To manufacture leather, rubber and cloth fabrics.

Durlastic Manufacturing Co., Inc., August 25 (New York), $15,000. D. Alperin, 99 Avenue C; A. Draisin, 50 East 108th street; C. Baron, 500 West 177th street—all in New York City. To sell rubber garters, belts, etc.

East End Tire Company of Erie, Inc. March 10 (Delaware), $25,000. W. R. Hull, president, 119 West 18th street; W. H. Swarthout, secretary and treasurer, 2518 Plum street, both of Erie; H. G. Pagani, director; F. W. Fischlein, director, both of 5901 Penn avenue, Pittsburgh—both in Pennsylvania. Principal office, 1619 State street, Erie, Pennsylvania. To sell Kenyon cord tires and tubes.

Excel All Puncture Proof Inner Tube Co., Inc., August 8 (New Jersey), $125,000. F. G. Schaefer; D. A. Farrington, both of 673 Summit avenue, Jersey City; E. J. Williams, River Edge—both in New Jersey. Principal office, 673 Summit avenue, Jersey City, New Jersey. Agent in charge, F. G. Schaefer. To manufacture and sell automobile tubes, tires, etc.

Factory Tire Outlet Corporation, September 10 (New York), $250,000. H. Pivnick, 729 Saratoga avenue, Brooklyn; F. C. Corson, 664 117th street, Richmond Hill, Long Island; I. Brenner, 41 Park Row, New York—all in New York. Principal office, Brooklyn, New York. To manufacture rubber and gutta percha goods.

Falor Manufacturing Co., The, August 18 (Ohio), $50,000. S. A. Falor, C. F. Schnee; J. C. Grimm; J. Thomas; J. Hill—all of Akron, Ohio. Principal office, 126 West South street, Akron, Ohio. To manufacture inner tubes.

Forest Tire & Rubber Co., August 22 (Ohio), $5,000. S. I. Gottlieb; A. Z. and M. M. Jaffe; R. H. Bender; V. C. Lynch—all of Cleveland, Ohio. Principal Office, 908 Woodland avenue, Cleveland, Ohio. To manufacture good cord tires.

Goliath Rubber Co., March 12 (Ohio), $50,000. G. Wilson, president; C. W. Koehler, vice-president; L. H. Wallace, treasurer; I. S. Fenn, secretary; A. B. Mackey, general manager. Principal office, Cleveland, Ohio. To manufacture hard and soft mechanical rubber goods.

Henry Tire Corporation, August 16 (Delaware), $150,000. E. E. Allison, 130 Convent avenue; C. R. Allison, Marie Antoinette Hotel—both of New York City; A. K. Dohrmann, 103 Bleecker street, Jersey City, New Jersey. Delaware agent, Capital Trust Co. of Delaware, Dover, Delaware. To manufacture and deal in tires.

Income Rubber Co., August 23 (Ohio), $90,000. C. R. Spahn; M. S. Osborn; E. B. King; A. K. Nier; J. F. Flynn, Jr.—all of Columbus, Ohio. To manufacture tires, tubes, clothing, etc.

Insulation & Specialty Corporation of America, The, August 31 (Delaware), $250,000 par value, $100, preferred stock, and 2,500 shares of common stock without nominal or par value. W. L. Broman; P. C. Hennig; J. L. McIntire—all of Wilmington, Delaware. Principal office, 7 West 10th street, Wilmington, Delaware. To buy and sell insulating materials.

J. & J. Battery Auto Supply Service, Inc., September 14 (New York), $50,000. Jack Heimbinder, president; Jeanne Gold, vice-president; Joseph Gold, treasurer; Jeanette Heimbinder, secretary. Principal office, 3025 Fort Hamilton Parkway, Brooklyn, New York. To deal in automobile accessories.

New Jersey Chemical & Rubber Works, Inc., June 21 (New Jersey), $100,000. M. Gusman, president; N. Ginsburg, vice-president and secretary; J. Janoff, treasurer. Principal office, Broadway, Hillside, New Jersey.

Penn Rubber Products Corporation, July 9 (Delaware), 50,000 shares without nominal or par value. F. R. Hansell; J. V. Pimm—both of Philadelphia, Pennsylvania; E. M. MacFarland, Camden, New Jersey. Delaware agent, Corporation Guarantee & Trust Co., Ford Building, Wilmington, Delaware. To manufacture, buy and sell rubber goods, etc.

Porteous Products Co., Inc., The, September 2 (New York), $25,000. A. G. Porteous, 68 West 128th street, New York; F. L. Woodward, 358 73rd street, Brooklyn; W. R. Chamberlain, 247 Bedford avenue, Mt. Vernon—all in New York. To manufacture rubber goods.

Quality Rubber Co., September 2 (Ohio), $50,000. W. S. Kurtz, president; L. A. Swineford, vice-president; F. W. Saltsman, secretary and treasurer—all of Ashland, Ohio. Principal office, 114 Seventh street, Ashland, Ohio. To manufacture rubber balloons, surgeons' gloves, etc.

Roney Tire & Auto Co., July 27 (Tennessee), $10,000. O. B. Roney; M. Jr., C. and E. W. Benz; C. G. Kimbrough. Principal office, 21st avenue S., Nashville, Tennessee. To deal in automobile accessories.

Royal Tire Co., Inc., September 2 (New York), $10,000. J. Rosenblum, 17 West 108th street; M. Hurewitz, 35 East 110th street; I. Rosenblum, 1519 Benson street—all in New York City. To deal in tires and accessories.

Royal Tire Fabric Co., Inc., August 20 (Massachusetts), $50,000. D. Miller, 49 Aetna street; S. Miller, 102 Providence street; H. Taber, 35 Catherine street—all of Worcester, Massachusetts. Principal office, Worcester, Massachusetts. To manufacture tire fabrics.

Rubber Service Co., The, August 31 (New Jersey), $50,000. A. K. White, 149 Livingston avenue; C. R. Holman, 51 Remsen avenue, both of New Brunswick; H. W. Ritter, Main street, South River—both in New Jersey. Principal office, corner Causeway and Water streets, South River, New Jersey. Agent in charge, H. W. Ritter. To manufacture and sell dipped rubber goods.

Safety First Patch Co., August 26 (Maryland), $100,000. G. E. Thrall; H. T. Aldrich, both of 320 South Patterson Park avenue; H. R. Baker, 1520 Fidelity Building—both of Baltimore, Maryland. Principal office, 1520 Fidelity Building, Baltimore, Maryland. To manufacture rubber specialties.

Schrader's Sons, Inc., of Ohio, A., August 23 (Delaware), $100,000. W. T. Hunter, Jr., 43 Linden avenue; E. J. Phillips, 1177 Dean street, both of Brooklyn; M. C. Schweinert, 42 Riverside Drive, New York; P. G. Cole, 63 Greenway North, Forest Hills—all in New York; J. Volckhausen, 54 Fulton street, Weehawken, New Jersey. Delaware agent, Corporation Trust Company of America, Du Pont Building, Wilmington, Delaware. To manufacture and deal in tires, etc.

Solimine Trading Co., Inc., August 25 (New York), $60,000. R. Blando, 2 Broadway; W. D. Yankauer, 67 Wall street, both of New York; A. Scodes, 439 Franklin avenue, Brooklyn—both in New York. To manufacture rubber heels.

Stalwart Rubber Co., August 18 (Ohio), $10,000. H. B. Denman; F. B. Burch; W. Bacon; S. Denlinger; R. H. Miner—all of Cuyahoga Falls, Ohio. To manufacture molded and hand made rubber goods.

Studebaker-Wulff Rubber Co., August 25 (Ohio), 10,000 shares no par value. P. E. Studebaker; H. C. Burchannan; B. F. Wulff; K. Stock; S. A. Senter—all of Zanesville, Ohio. Principal office, Zanesville, Ohio. To manufacture and deal in rubber tires and all kinds of rubber goods.

Trent Rubber Co., Inc., September 1 (New Jersey), 10,000 shares of common stock having no nominal or par value. L. M. Martino; W. V. Lee; G. Gildea—all of Trenton, New Jersey. Principal office, Enterprise avenue, Trenton, New Jersey. Agent in charge, T. H. Thropp. To manufacture and deal in tires, tubes, etc.

Tuscora Tire Co., August 19 (Ohio), 250 shares no par value. W. A. McAfee; A. B. Oakes; T. F. Veach; A. A. Stainbaugh; R. C. Schmidt—all of 928 Hann Building, Cleveland, Ohio. To manufacture and deal in tires and tubes.

Two Thirty Five Tire & Vulcanizing Co., August 4 (Tennessee), $5,000. S. R. and W. C. Oursler; H. E. Richardson; J. C. Hodge; J. A. Robinson, Jr. Principal office, Memphis, Tennessee. To deal in tires.

Union Rubber Co., Inc., August 12 (Maine), $500,000. C. L. Lello; F. S. Twiss; H. Murchie—all of Calais, Maine. Principal office, Calais, Maine. To manufacture tires.

United Wares Corporation, September 16 (New York), $20,000. F. Britz, 2074 Wyse avenue; P. Glasstetter, 1983 Crotona avenue, both of Pronx; A. Schneider, 147 South Ninth street, Brooklyn—both in New York. To manufacture rubber goods, etc.

Waukon Rubber Co., August 22 (Ohio), $300,000. E. A. and F. E. Stetson; A. S. Dollison; W. R. Huntington; J. W. Dewhurst—all of Elyria, Ohio. To manufacture rubber balloons, gloves, etc.

Activities of The Rubber Association of America

AUTOMOBILE FABRIC MANUFACTURERS MEETING

THE meeting of the automobile fabric manufacturers' section of the Rubber Proofers' Division held in New York on September 14, was the most interesting and profitable that has yet been held. The topics discussed included rules covering the inspection of finished automobile top materials, and recommended contract conditions for proofers of automobile fabrics.

PROOFERS ADOPT CODE SYSTEM FOR STATISTICS

At a meeting of the Rubber Proofers' Division held September 14, it was decided to follow the practice of the other divisions by using a code system for statistical records. The use of this method will positively preclude the possibility that the figures furnished by any manufacturer shall become public property. The reports rendered by individual proofers will be returned to them with copies of the totaled reports prepared by the Association.

TIRE RATE CHANGES

The Canadian Classification Committee, representing common carriers in the Dominion, recently declined the application of Canadian tire manufacturers which requested the establishment of a third-class rating on pneumatic tires in carloads, minimum weight 20,000 pounds. The question was appealed to the Canadian Board of Railroad Commissioners and extended to include first-class rating for pneumatic tires in less than carloads in paper wrapped bundles or bales when strapped with metal bands. The Board of Railroad Commissioners has issued an order granting the application. The change became effective September 10, 1921.

The State Corporation Commission of Virginia has authorized the revision of the Virginia classification rating on pneumatic tires in accordance with the policy of the Traffic Committee of the Association to bring about uniform classification ratings on tires.

The Mississippi state classification has been amended, effective October 15, 1921, placing pneumatic and solid tire ratings in carloads and less than carloads on the same basis as the Southern Classification.

This will permit manufacturers to ship pneumatic tires in less than carloads in paper-wrapped bales or bundles at first-class rating, and in carloads at third-class. Under this amendment to the classification, solid tires attached to iron or steel bases may be shipped loose or in crates.

The Mexican Government recently issued a decree providing for a change effective November 1, in import duties on automobile tires, as follows: tires for use on passenger cars—1 peso per kilo; tires for use on trucks—50 centavos per kilo.

TESTS AND SPECIFICATIONS

RAILWAY GOODS

The committee on specifications and tests for material of the American Railway Association has approved the "General Instructions on Standard Methods of Test" formulated by a joint committee composed of the Specification Committee, Mechanical Goods Division of the Rubber Association, and a sub-committee of the American Railway Association Committee.

The general instructions provide for testing mechanical rubber goods commonly used by railroads and permit writing concise and comprehensive specifications with the omission of details on test requirements.

The Joint Committee, has been working on specifications for tender hose, steam hose, long length air hose and axle-light belting which will soon be completed and offered to all members of the American Railway Association, embracing all common carriers in the United States, as standard practice.

JAR RINGS

The Bureau of Standards will issue a new specification covering jar rings. The Specification Committee, Mechanical Goods Division of the Association, has been requested to study the requirements contained in the old specification and offer comments or criticisms so that the new specification, will have the approval of everyone interested.

FELLOE BAND WIDTHS

The Association has referred to wheel and truck manufacturers the suggestion to increase the width of felloe bands on single tire sizes to the nominal width of the tires.

CLINCHER RIM STOCK

The special committee appointed to investigate this subject recommends that, when ordinary rim steel is used for making clincher rims, the minimum thickness of the rim at any point shall not be less than ⅛-inch, subject to customary rolling mill tolerance.

REPORT OF INVENTORY—PRODUCTION—SHIPMENTS—(DOMESTIC) OF PNEUMATIC CASINGS—INNER TUBES—SOLID TIRES

November, 1920, to and including July, 1921

Month	Pneumatic Casings				Inner Tubes				Solid Tires			
	No. Mfrs. Reporting	Inventory	Production	Shipments	No. Mfrs. Reporting	Inventory	Production	Shipments	No. Mfrs. Reporting	Inventory	Production	Shipments
November, 1920	36	5,880,016	649,742	806,023	40	6,131,935	742,815	920,938	11	298,875	21,355	34,217
December, 1920	43	5,508,380	506,111	1,327,153	43	5,786,929	508,446	1,481,285	12	303,473	16,297	40,828
January, 1921	45	5,319,605	703,430	965,417	47	5,586,163	740,824	1,042,617	12	303,753	21,220	29,116
February, 1921	45	5,193,018	819,892	1,073,756	46	5,415,464	916,627	1,129,881	12	304,374	23,365	29,599
March, 1921	46	4,597,103	1,163,314	1,614,651	48	5,044,861	1,346,483	1,643,690	12	283,800	28,710	43,926
April, 1921	49	4,527,445	1,651,418	1,785,951	51	4,916,772	1,762,122	1,983,571	12	269,985	28,859	42,080
May, 1921	59	4,451,668	2,100,917	2,085,882	57	4,751,880	2,210,040	2,342,567	12	264,633	35,156	40,122
June, 1921	63	4,154,456	2,313,265	2,643,850	60	3,835,098	2,359,928	3,232,673	11	240,336	28,395	49,867
July, 1921	63	3,892,037	2,570,524	2,757,581	61	3,122,815	3,020,981	3,603,248	11	220,003	35,123	55,678

"Production" and "Shipments" figures cover the entire month for which each report is made. "Inventory" is reported as of the last day of each month.

"Inventory" includes tires and tubes constituting domestic stock in factory and in transit to, or at, warehouses, branches (if any), or in possession of dealers on consignment basis, and as a total represents all tires and tubes still owned by manufacturers as a domestic stock.

"Shipments" includes only stock forwarded to a *purchaser* and does not include stock forwarded to a warehouse, branch, or on a consignment basis, or abroad.

News of the American Rubber Industry

FINANCIAL NOTES

MILLER'S BUSINESS INCREASED

BUSINESS of the Miller Rubber Co. has increased since June 1 from 55 per cent of the corresponding period of last year to 82 per cent. Since January 1 the company has reduced inventory sufficiently to reflect a reduction in total indebtedness from $8,676,000 to $2,400,000, of which $1,400,000 is owing to banks. The company has accounts receivable approximating $3,100,000 and $1,200,000 cash in banks. Neither of the above indebtedness figures account for commitment losses which have been reduced approximately $400,000.

"Because of a present book deficit," says Mr. Pfeiffer, "we are unable to declare a dividend on preferred stock, and owing to uncertainty of business conditions it will be impossible to indicate when payment of dividends can be resumed, as this will depend on future business and prevailing prices."

FISK RUBBER CONSOLIDATION

The successful flotation of an issue of $10,000,000 first mortgage bonds authorized September 7 by stockholders of the Fisk and Federal rubber companies, marks the completion of plans to consolidate The Fisk Rubber Co., Federal Rubber Co. and Ninigret Co. in a single organization and management.

The following information regarding the companies in the consolidation is from official sources:

THE FISK RUBBER CO.

The Fisk Rubber Co., incorporated in 1912, with plant at Chicopee Falls, Massachusetts, is one of the five largest manufacturers of pneumatic and solid tires for automobiles and trucks in the United States.

In addition to automobile tires, a complete line of solid tires for trucks and pneumatic cord tires for both light and heavy trucks are produced. Bicycle tires, bicycle and automobile tire accessories and tire sundries complete the Fisk line. Its business has grown continuously, sales increasing from $9,584,231 in 1913 to $42,141,241 in 1920. Through the acquisition of their properties The Fisk Rubber Co. is to consolidate with The Federal Rubber Co. and the Ninigret Co. under a plan to acquire also all the stocks of the two other companies. The Federal and Ninigret companies have been heretofore controlled through stock ownership and operated under the supervision of officers of The Fisk Rubber Co.

THE FISK RUBBER CO.'S PLANT, CHICOPEE FALLS, MASSACHUSETTS

THE FEDERAL RUBBER CO.

The Federal Rubber Co., incorporated in 1916, with plant located at Cudahy, Wisconsin, is a large manufacturer of pneumatic tires. Federal production also includes a complete line of pneumatic cord truck tires, bicycle tires, automobile and bicycle tire accessories and sundries, together with a miscellaneous line of mechanical rubber goods. Its sales have increased from $4,582,433 in 1916 to $13,911,993 in 1920.

THE NINIGRET CO.

The Ninigret Co., controlled since 1919, owns plants at Pawtucket and Westerly, Rhode Island, and operates also a leased plant at Jewett City, Connecticut. The company manufactures tire fabrics, carrying through the entire process from raw cotton to finished product.

COMBINED INCOME

The combined income account for the past five fiscal years of the companies now being consolidated—including the Ninigret Co. for 1920 only, that being the first full year since control was acquired—shows as follows:

Fiscal Year Ended Dec. 31.	1920	1919	1918	1917	1916
Net sales	$59,172,358	$57,419,360	$46,836,567	$37,922,688	$23,967,121
Gross profit after provision for depreciation	17,834,415	16,322,484	12,923,383	11,027,561	6,912,173
Administrative selling and general expense	10,589,864	9,256,230	7,264,573	5,996,831	4,603,086
Net income available for interest, taxes and inventory adjustments	*$7,244,551	$7,066,254	$5,658,810	$5,030,730	$2,309,087

*At the close of the fiscal year ended December 31, 1920, $3,134,305 was written off net income in adjustments of inventories.

Since that date further adjustments have been made, aggregating $10,232,042, covering not only materials on hand but also rubber and fabric under commitment. At the present time the larger part of the raw materials against which these adjustments were made have been manufactured and sold.

UNITED STATES RUBBER CO. REPORTS HALF-YEAR DEFICIT

Reduction in prices of goods, higher manufacturing costs and unusual selling expenses are among the reasons stated by Charles B. Seger, president of the United States Rubber Co., for the deficit noted in the company's report for the first six months of 1921. Regarding this deficit of $4,875,223, after all interest and other charges, Mr. Seger said: "Against this the company has reserves, heretofore created out of income to cover contingencies which might arise, sufficient to offset this deficit, but it is deemed proper to report the actual results and await the realization of the results for the last six months of the year, which we hope and believe will show substantial improvement."

LEE TIRE & RUBBER CO. IN PROSPEROUS CONDITION

With no debts outstanding and with cash on hand of approximately $750,000 the Lee Tire & Rubber Co. occupies at present a strong position financially. Contracts are in effect for rubber at prices lower than the current market and these run through the first quarter of next year. Operations at the plant are continuing under excellent conditions, and earnings for the year will undoubtedly be the greatest in the company's history. Last year the

earnings equaled $2.18 a share and two years ago $3.15, while this year the balance should be well above the latter figure.

THE FISK BOND ISSUE

In connection with the consolidation of The Fisk Rubber Co., the Federal Rubber Co. and the Ninigret Co. the stockholders of these organizations recently sanctioned the issuance of $10,000,000 first closed mortgage, 20-year, 8 per cent sinking fund gold bonds dated September 1, 1921, to permit financing the merger.

The mortgage will provide for a sinking fund accruing from the date of the bonds and available semi-annually, to purchase $500,000 bonds each year if obtainable at or below 110 and interest. Any unexpended balance of the semi-annual sinking fund will be added to the sinking fund provided for retirement of the company's first preferred stock. All bonds acquired by the sinking fund are to be cancelled.

During the life of these bonds, control of the management of the company, through the right to elect two-thirds of the board of directors, will be vested in James Dean of Dillon, Read & Co., Otis H. Cutler, chairman of the board of the American Brake Shoe & Foundry Co., and H. T. Dunn, president of The Fisk Rubber Co., or their successors, through the issue of management stock.

DECLARED DIVIDENDS

Company	Stock	Rate	Payable	Stock of Record
Ames Holden Tire Co., Limited	Com.	8% an.	Sept. 1	.....
Boston Woven Hose & Rubber Co.	Com.	1½% q.	Sept. 15	Sept. 1
Brunswick-Balke-Collender Co.	Pfd.	1¾% q.	Oct. 1	Sept. 20
Canadian Consolidated Rubber Co., Limited	Pfd.	1¾% q.	Sept. 30	Sept. 23
Corn Products Refining Co.	Com.	$1.00 q.	Oct. 20	Oct. 4
Corn Products Refining Co.	Com.	$0.50 ex.	Oct. 20	Oct. 4
Corn Products Refining Co.	Pfd.	1¾% q.	Oct. 15	Oct. 4
Dayton Rubber Manufacturing Co., The	Pfd.	1¾% q.	Oct. 1	Sept. 15
du Pont, E. I. de Nemours & Co.	Com.	2% q.	Sept. 15	Aug. 8
du Pont, E. I. de Nemours & Co.	Deb.	1½% q.	Oct. 25	Oct. 1
Firestone Tire & Rubber Co.	6% Pfd.	1½% q.	Oct. 15	Oct. 1
Firestone Tire & Rubber Co.	7% Pfd.	1¾% q.	Nov. 15	Nov. 1
General Tire & Rubber Co., The	Pfd.	1¾% q.	Oct. 1	Sept. 20
Goodrich, B. F. Co., The	Pfd.	$1.75...	Oct. 1	Sept. 22
Hood Rubber Products Co., Inc.	Pfd.	1¾% q.	Sept. 1	Aug. 20
Kelly-Springfield Tire Co.	6% Pfd.	1½% q.	Oct. 1	Sept. 16
Martin Tire Corporation	Pfd.	4% s.a.	Sept. 20	Sept. 10
United Shoe Machinery Co.	Com.	$0.50 q.	Oct. 5	Sept. 20
United Shoe Machinery Co.	Pfd.	$0.37½ q.	Oct. 5	Sept. 20

AKRON RUBBER STOCK QUOTATIONS

The following are closing quotations of September 19, supplied by the App-Hillman Co., Second National Building, Akron, Ohio:

	Bid	Asked
American R. & T. Co., com.	30	40
Amazon Rubber Co., The	..	15
Firestone T. & R. Co., com.	55	60
Firestone T. & R. Co., 6% pfd.	82	85
Firestone T. & R. Co., 7% pfd.	73	75
General T. & R. Co., The, com.	150	200
General T. & R. Co., The, 7% pfd.	75	78
Goodrich, B. F., Co., The, com.	31	33
Goodrich, B. F. Co., The, pfd.	75	80
Goodrich, B. F., Co., The, 5-yr. 7% notes	90½	91½
Goodyear, T. & R. Co., The, com.	10½	11¼
Goodyear T. & R. Co., The, 7% pfd.	27½	29
India T. & R. Co., com.	65	70
India T. & R. Co., 7% pfd.	..	70
Mason T. & R. Co., The, com.	9	10
Mason T. & R. Co., The, 7% pfd.	45	50
Marathon T. & R. Co., com.	2½	3½
Miller Rubber Co., The, com.	45	60
Miller Rubber Co., The, 8% pfd.	70	73
Mohawk Rubber Co., The	65	80
Phoenix Rubber Co., com.	..	15
Phoenix Rubber Co. pfd.	..	80
Portage Rubber Co., The, com.	..	1
Portage Rubber Co., The 7% pfd.	..	3
Republic Rubber Corporation, com.	17c	25c
Republic Rubber Corporation, 7% pfd.	10	15
Republic Rubber Corporation, 8% pfd.	..	2½
Rubber Products Co., The	35	60
Standard Tire Co., com.	..	80
Standard Tire Co., pfd.	..	80
Star Rubber Co., com.	..	90
Star Rubber Co., 8% pfd.	..	90
Swinehart T. & R. Co., com.	..	40
Swinehart T. & R. Co., 7% pfd.	..	70

NEW YORK STOCK EXCHANGE QUOTATIONS

SEPTEMBER 21, 1921

	High	Low	Last
Ajax Rubber Co., Inc.	24¼	23	24¼
Fisk Rubber Co., The	10	10	10
Goodrich Co., B. F., The	31	30¾	30¾
Kelly-Springfield Tire Co.	42	39⅝	41
Keystone T. & R. Co., Inc., The	11½	11¼	11¼
Lee R. & T. Corporation	25¾	25½	25¾
United States Rubber Co.	48⅛	46⅝	47⅞
United States Rubber Co., 1st pfd.	85½	85	85¼

CHARLES B. SEGER HEADS UNITED STATES RUBBER BOARD

CHARLES B. SEGER, president of the United States Rubber Co. since January 1, 1919, has been also elected chairman of the company's board of directors, to fill the position formerly held by the late Colonel Samuel P. Colt. Mr. Seger holds a directorship with several other companies, including the United States Mortgage and Trust Co., the Western Union Telegraph Co., the International Acceptance Bank, the Union Pacific Railroad, the Oregon Short Line Railroad, and the Oregon and Washington Railroad and Navigation Co.

CHARLES B. SEGER

Previous to his association with the United States Rubber Co. Mr. Seger held, in 1913, the position of vice-president and controller of the Union Pacific system. While connected, during the most of his business career, with railroad interests, Mr. Seger, by his broad general experience and executive ability, has made himself invaluable to the United States Rubber Co., which owes much of its present importance to the advice and assistance given by this able official.

THE RUBBER TRADE IN THE EAST AND SOUTH

By Our Regular Correspondent

THE well-known products of A. Schrader's Son, Inc., Brooklyn, N. Y., manufacturer of tire valves, pressure gages, air chucks, etc., were recently displayed in the show windows of Charles E. Miller, dealer in automobile supplies, 231 West 54th street, New York, N. Y.

Under the firm name of MacNamara & Weber, Alfred B. MacNamara and E. Weber, brokers in crude rubber, have recently opened offices at 136 Liberty street, New York, N. Y.

The firm of Jungmann & Co., Inc., formerly engaged as brokers in chemicals, has been entirely reorganized, and a new corporation, without change of name, has been formed. The new concern, which has acquired the business of R. Bardewick, as well as other important connections here and abroad, will function hereafter exclusively as commission merchants, importers and exporters of chemicals, drugs and raw materials, with offices at 150 Nassau street, New York, N. Y. J. Jungmann is president and Paul Gutschow is secretary of the new organization.

W. Hammesfahr & Co., crude rubber brokers, announce the removal of their offices from 68 Broad street to 68 Beaver street, New York, N. Y.

Lloyd L. Libby has recently joined the sales forces of the Goodyear Rubber Co., 787 and 789 Broadway, New York, N. Y. Mr Libby has had much experience in the rubber industry, both in the United States and in Canada.

The Gryphon Rubber & Tire Corporation, 192nd street and Bailey avenue, New York, N. Y., manufacturer of Keystone cord tires, is building an addition to its plant which will cover approximately 30,000 square feet, and plans also the erection of a smaller unit of approximately 10,000 square feet. D. W. Whipple is the president of the company.

C. P. L. Huston, president of The Rubber Insulated Metals Corporation, 91 William street, New York, N. Y., announces that his company is no longer associated with The Century-Plainfield Tire Co., and that, in future, the company will manufacture mechanical goods exclusively, employing the patent Elchemco rubber insulation process for the attachment of rubber to metals. William F. Hart will resume his duties as sales manager.

R. W. Wheeler, for the past six years with The Osborn Manufacturing Co., Cleveland, Ohio, has resigned as sales manager of that concern. After October 1, he will be associated with The North Eastern Manufacturing Co., New Haven, Connecticut, manufacturer of the Interlox rotary wire buffing wheels.

The Top Notch cord tire has recently been placed on the market by the Advance Rubber Co., 29-31 Gardner avenue, Brooklyn, N. Y., who claim that this product, which is the result of careful experiment and tests, fully justifies the title. These tires are being manufactured in a new plant, equipped with modern machinery. Louis Getz, formerly connected with The Braender Tire & Rubber Co. and The Sterling Tire & Rubber Co., recently became a member of the Advance company's official organization.

At a recent meeting of the board of directors of the Ajax Rubber Co., Inc., 1796 Broadway, New York, N. Y., H. J. Pritchard was elected vice-president, treasurer, and one of the directors of the company.

L. Blitz, dealer in crude rubber, announces the removal of his office from 25 West Broadway to the Scandinavian-American Building, 16-18 Bridge street, New York, N. Y.

Announcement has been made that the Continental Crude Products Co., broker in crude rubber, has recently opened an office at 98 Park Place, New York, N. Y.

The Allen Machine Co., Erie, Pennsylvania, includes in its list of Allen equipment users, leading rubber manufacturers not only in this country, but also in many other countries throughout the world. The company manufactures a complete line of rubber mill equipment.

The Vulcweld Rubber Co., of Pottstown, Pennsylvania, whose plant was destroyed by fire about a year ago, plans the erection of a new factory. Since the burning of its mill the company has been having its tires and tubes manufactured at Armstrong, New Jersey.

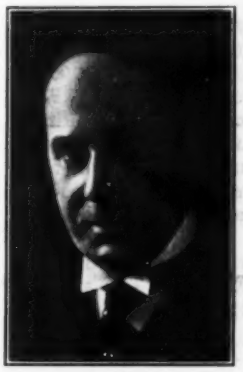
The fire that occurred several months ago at the plant of the Keystone Rubber Manufacturing Co. of Pennsylvania, Erie, Pennsylvania, resulted in a loss of approximately $75,000. A new building, at 141-143 East 11th street, is being constructed along practically the same lines as the one which it replaces, and will be a three-story building, measuring 123 by 165 feet. Officers of the company are: Joseph G. Moomy, president and treasurer; Harry E. Moomy, secretary and assistant treasurer, and J. H. Moomy, second vice-president.

Plans are under way for the enlargement of the floor space of the Hydro-United Tire Co., Inc., Charlotte and Hanover streets, Pottstown, Pennsylvania, and contracts call for the completion of the additions by January 1, 1922. The company expects to install new machinery and be ready for operation two months later. The changes proposed will enable the company to duplicate the output of the present plant, when 2,500 tires a day will be manufactured.

Additional floor space of approximately 4,000 square feet has been provided and more machinery installed at the plant of the Cord Tire Corporation, Chester, West Virginia. Steadily increasing sales during the summer have proved the inadequacy of the present accommodations for receiving, storing and shipping purposes. The company manufactures "Superior" cord tires, and claims that mileage records for these tires of 15,000 and 20,000 miles are the rule, and not the exception.

BARNARD-LYNAH, INCORPORATED

A new corporation, to be known as Barnard-Lynah, Incorporated, 321 Broadway, New York, has been formed by O. A. Barnard, a well-known figure in the American rubber industry. The new organization will act as selling agents for cotton mills specializing in the manufacture of cotton ducks, drills, sheetings, yarns and fabrics for the rubber trade.



O. A. Barnard

Associated with Mr. Barnard will be James Lynah, for many years in charge of the Du Pont Artificial Leather Works at Newburgh, New York, and who was during the war manager of this company's Haskell smokeless powder plant.

Mr. Barnard resigned from the firm of J. H. Lane & Co., having been for more than twenty-five years connected with that company, acting in the capacity of general manager, secretary and a director in several of the mills. He is an old member of The Rubber Association, and has many friends in the rubber industry who extend to him their best wishes.

EUREKA RUBBER MANUFACTURING CO.'S NEW PLANT

Eureka Rubber Manufacturing Co., Inc., orginally at College Point, Long Island, is now operating in its new plant at Long Island City, N. Y. Additional mills and calenders have been installed, and new equipment has been developed for supplying the rubber trade with spread and calendered fabrics.

Eureka Rubber Manufacturing Co.'s Plant, Long Island City, L. I.

This company, which was incorporated in 1916, has carried on a successful line of business since the beginning. It is at present manufacturing sheet rubber in various forms, and rubber specialties, for various purposes. Harry Yellin is president and general manager.

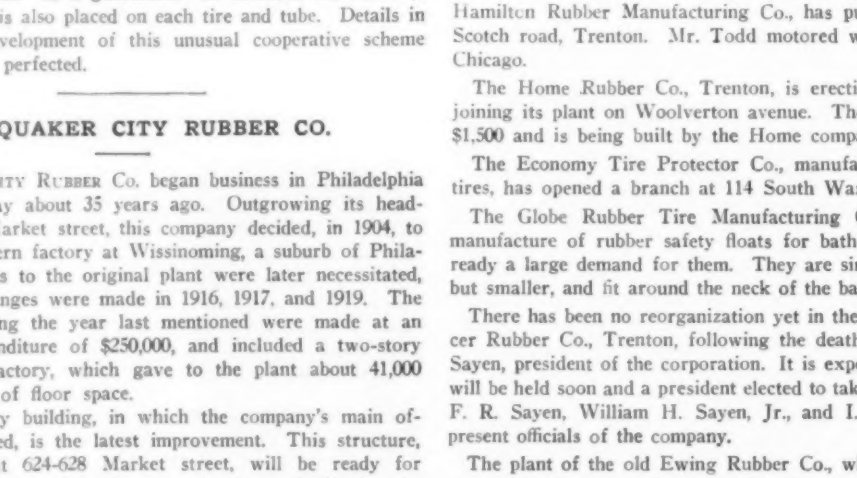
"CULP PLAN" IN OPERATION

George K. Culp, Inc., 56 West 45th street, New York, now includes in its organization six tire and tube manufacturing companies, for some time identified with the rubber industry, and who will also cooperate in the new merchandising and manufacturing plan. Shipments of tires and tubes have been made to the Culp plan dealers by these factories, and all merchandise passing from these plants through the Culp organization is branded "Culp Plan" as a guarantee. In addition the name of the manufacturer is also placed on each tire and tube. Details in regard to the development of this unusual cooperative scheme are being rapidly perfected.

THE QUAKER CITY RUBBER CO.

THE QUAKER CITY RUBBER CO. began business in Philadelphia in a small way about 35 years ago. Outgrowing its headquarters at 409 Market street, this company decided, in 1904, to erect a large modern factory at Wissinoming, a suburb of Philadelphia. Additions to the original plant were later necessitated, and important changes were made in 1916, 1917, and 1919. The enlargements during the year last mentioned were made at an approximate expenditure of $250,000, and included a two-story addition to the factory, which gave to the plant about 41,000 more square feet of floor space.

A new five-story building, in which the company's main offices will be located, is the latest improvement. This structure, just completed, at 624-628 Market street, will be ready for occupancy November 1. Branch stores, for better facilitating the distribution of the company's products, are located at Chicago, Pittsburgh, and New York.



QUAKER CITY RUBBER CO.'S PLANT, WISSINOMING, PHILADELPHIA, PENNSYLVANIA

Quaker products also have been increased in number, in line with the enlargements of the plant. The company at first confined its efforts to the successful manufacture of Daniel's P. P. P. rod packing, but later added a complete line of mechanical rubber goods, including belting, hose of all kinds, rod and sheet packings, gaskets, tubings, as well as automobile tires and tubes. The specialties turned out by the company, and of which they are the sole manufacturers, include Daniel's P. P. P. rod packing, Ebonite sheet packing, Ironsides rubber belt, Ebonite steam hose, Yankee garden hose and Quaker tires and tubes.

Officials of this company claim that the growth and success of their business is due to the fact that quality has been insisted upon as the most important essential of all their work. The officers of the Quaker City Rubber Co. are as follows: C. A. Daniel, president and treasurer; William F. Metzger, vice-president; H. R. Shellenburger, secretary and assistant treasurer; J. T. Moore, sales manager; and F. W. Daniel, factory superintendent.

THE RUBBER TRADE IN NEW JERSEY

By Our Regular Correspondent

THERE is a noted improvement in mechanical goods lines at the Trenton rubber plants, due to the increase in building of late. The tire business is now at its height, but it is believed that the trade will begin to drop off during the late fall. Tires are being sold at the lowest prices in some years, according to the manufacturers, and are being made of better material than during the war.

TRENTON NOTES

Hobart H. Todd, of Chicago, general sales manager of the Hamilton Rubber Manufacturing Co., has purchased a home on Scotch road, Trenton. Mr. Todd motored with his family from Chicago.

The Home Rubber Co., Trenton, is erecting a storehouse adjoining its plant on Woolverton avenue. The structure will cost $1,500 and is being built by the Home company's mechanics.

The Economy Tire Protector Co., manufacturer of caterpillar tires, has opened a branch at 114 South Warren street, Trenton.

The Globe Rubber Tire Manufacturing Co., has begun the manufacture of rubber safety floats for bathers and there is already a large demand for them. They are similar to inner tubes, but smaller, and fit around the neck of the bather.

There has been no reorganization yet in the affairs of the Mercer Rubber Co., Trenton, following the death of William Henry Sayen, president of the corporation. It is expected that a meeting will be held soon and a president elected to take Mr. Sayen's place. F. R. Sayen, William H. Sayen, Jr., and I. Ely Reed are the present officials of the company.

The plant of the old Ewing Rubber Co., which was nearly destroyed by fire some time ago, has been purchased by Milton Mirkens, of Trenton, who will remodel the plant, install machinery and begin within a short time the manufacture of rubber goods.

The Ajax Rubber Co., Inc., Trenton, has won the case instituted against it because of the closing up of a street on which the plant is located. Property owners applied to the New Jersey Supreme Court for a writ to review the legality of the ordinance allowing the Ajax Company to close the street, but Justice Katzenbach denied the writ.

MISCELLANEOUS NEW JERSEY NOTES

The problem of refinancing the Stanwood Rubber Co., at Elizabeth, is still under consideration by the committee appointed to confer with the receiver, John Kirkpatrick, of New Brunswick, who is operating the factory. The committee is composed of former Governor Foster M. Voorhees and Clark McK. Whittemore, of Elizabeth, with Thomas G. Gardner, of Passaic, and J. G. Lamison and John Mattola, of New York, N. Y. The committee is considering a plan submitted by Manning Stires, of

New York, N. Y. The idea is to hold the property until conditions are more favorable for its sale at a fair price. It is also hoped to revive the business again, and because of the low prices of raw materials it is believed that the manufacture of tires can be made a profitable business.

Upon complaint of creditors with claims aggregating more than $200,000, the New Jersey Car Spring & Rubber Co., Inc., Jersey City, has been adjudicated a bankrupt by United States District Court Judge John Rellstab at Trenton. It is alleged in the complaint that the liabilities of the company are $473,000 and the assets $283,000. The defendant filed with the complaint an answer admitting its insolvency, and consented to be adjudged a bankrupt.

Operations at the plant of the Dural Rubber Corporation, Flemington, New Jersey, have been continued day and night since last May. M. L. Martin has been recently appointed southern district manager for the company, with headquarters at Dallas, Texas.

THE RUBBER TRADE IN RHODE ISLAND

By Our Regular Correspondent

ALTHOUGH the rubber manufacturing plants in Rhode Island have been idle or operating on a curtailed time and production schedule for some time it is interesting to glance at figures prepared by the State Commissioner of Labor to discover that the employes of the rubber industry are not the only class to suffer from the general business depression.

During the early part of September the Commissioner conducted an industrial survey of Rhode Island as regards the unemployed which, later in the month was reported to Secretary Herbert Hoover's conference on the unemployed held at Washington, D. C. As a result of the survey it was found that 32,755 persons in Rhode Island were without employment, and this did not include those who were working part time. This is four times the number of unemployed during normal times, and is approximately five and one-half per cent of the total state population. In normal times the number of unemployed will not exceed 8,000. It is hoped, however, that the climax of the depressed condition of business has been passed as the reports indicate that the number of unemployed throughout the state, taking all lines of industry into consideration, is gradually decreasing.

During the last six weeks there has been a gradual starting up of the textile factories making tire fabrics and on September 5 the National India Rubber Co. resumed work in full, about 3,000 persons having been reemployed. While there has been no definite assurance given by the management as to how long the plan will continue, it is thought that there will be sufficient work to keep going throughout the winter; five days a week. The plant had been closed down more than two months.

An amendment to the charter of the Tamarack Co. has recently been announced whereby the capital stock of that corporation has been reduced from $2,200,000 to $1,000,000 thus wiping out $1,200,000 of preferred stock which had been created under a plan to enlarge the company's facilities. The Tamarack Co. manufactures tire fabrics, supplying large concerns. Its main plant in Pawtucket was formerly the plant of the Jenckes Spinning Co., and it had also taken over the American Woolen Co.'s plant and expanded it as much as possible within the limits of the available space. The United States Cotton Co., established at Central Falls, was also acquired and at one time the Tamarack company planned to increase the capacity of a plant that had been established in Canada.

Foremen and foreladies of the National India Rubber Co.'s plant, Bristol, gave a clambake on Sunday, September 18, at the home of Mr. and Mrs. Louis N. Bernard, Bay View avenue. Guests from Worcester, Providence and Bristol were present. Preceding the bake, which was served at 3 o'clock, a number of athletic events were conducted in which the winners were as follows: potato race, Cornelius J. Gallagher; sack race, William McMillan; standing jump, Miss Mary McDonough; running broad jump, Augustine Nerone; egg and spoon race, Miss Lillian Kelley.

James W. Quinn, purchasing agent at the American Wringer Co.'s plant on Social street, Woonsocket, and for a number of years assistant plant manager, has resigned. He had been an employe of the company for 27 years.

T. B. Huestis of Bristol has been granted a patent on a machine for trimming rubber heels, which he has assigned to the National India Rubber Co. of that town.

THE RUBBER TRADE IN MASSACHUSETTS

By Our Regular Correspondent

THE rubber industry of Massachusetts is gradually showing greater activity. Rubber footwear deliveries are being made at about 75 per cent normal, and it is not unlikely that a shortage may develop in the event of a severe winter. The goods are being made practically only on order, and orders have been delayed by the desire of many dealers to "play safe." Manufacturers therefore expect to be busy throughout the remainder of the season.

At the request of the retail trade, rubber soled canvas footwear price-lists were not published until September 1. While this helped retailers to dispose of their stocks on hand, it may prove somewhat of a barrier to early orders in large volume. Business in sport lines tends to increase steadily, however, especially for gymnasium work, government orders and the southern resort trade. Then, too, new styles of heavy rubber soled shoes have become a big feature of the northern outing and hunting trade.

Tire output has decreased a little in some factories with the approach of autumn, but excellent driving weather is continuing the receipt of large dealers' orders longer than had been anticipated, and their stocks are so low, especially in the rural districts, that orders in fair volume are sure to be fairly continuous throughout the winter. Automobile price reductions have so stimulated the sale of new cars throughout New England that the business in spare tires alone has been considerable during the past two months.

The excellent weather which has helped the tire business has had an adverse effect upon waterproof clothing sales and dealers are fairly well stocked in anticipation of the autumn trade.

Mechanical rubber goods lines show a slight increase, reflecting gradually improving general business throughout the country, and the belief is commonly held that this will continue. Business in rubber soles and heels continues on about the same basis as last year. There is greater activity in druggists' sundries. With the buying season for this class of goods at hand and dealers' stocks known to be low, considerably increased orders are expected during the next few months.

MISCELLANEOUS MASSACHUSETTS NOTES

The Manhattan Rubber Manufacturing Co., Passaic, New Jersey, and the Gutta Percha & Rubber Manufacturing Co., New York, N. Y., are among the 54 corporations of states other than Massachusetts which have brought suit against former state treasurer Charles L. Burrill in an effort to recover back excise taxes paid under duress during the years 1914 to 1918. The excise law is held to be unconstitutional on the ground that the levy was made against the amount of authorized capital stock and not on the actual amount of business done in Massachusetts. Mr. Burrill is sued because he threatened to close the Massachusetts offices of the corporations in question unless they paid the tax, and because the short statute of limitations forbids bringing suit against the Commonwealth after a six months' period.

Massachusetts tire dealers are finding both consolation and actual sales in the fact that automobile registrations in this state for the first half of the present year were 45,543 ahead of the same period of 1920, which was regarded as an exceptional year. Truck registrations for the same period are 5,063 more

than last year. Evidently the sale of motor vehicles is still increasing.

The Genuine Rubber Co., Saugus, reports that business has shown a balance in its favor beginning with the third week of operation. An output of 350 gross of rubber heels weekly is anticipated within a few months. Another of the firm's specialties is a special soling which can be finished like leather and will not stretch out of its original shape. Nearly all of the stockholders of the company are working at the plant, each being an expert in his place, which is considered a great asset.

The August production of The Fisk Rubber Co., Chicopee Falls, actually ran up to 230,000 tires, or 5,000 in excess of maximum estimates at the opening of the month. This is the high-water mark for the year, and compares with the low record in May of only 65,000 tires.

Stone & Keener is a new firm at 130 Vernon street, Abington, which specializes in rubber cements for shoe manufacture.

BOSTON NOTES

The New England Tire & Rubber Co., Holyoke, has opened a sales branch at 778 Commonwealth avenue, where a full line of Holyoke cord tires is kept to meet the increasing requirements of the trade.

Advertisements in the Boston papers for young women to learn rubber shoe making are again a welcome sight not seen for several months, and indicate a noteworthy resumption of that trade.

The T. L. Harkins Machine Co., manufacturer of vulcanizing machinery and garage equipment, will occupy a new building located at 231-235 Brighton avenue, Boston, Massachusetts. The new structure, 60 by 120 feet, two stories in height, is built of reinforced concrete, and will contain the main offices and salesrooms, as well as the engineering department, while the foundry and machine shops will be maintained at Hyde Park. A feature of the salesrooms is a completely equipped vulcanizing shop, where visitors may have a practical demonstration of the company's equipment.

MEETING OF THE RUBBER SECTION—NATIONAL SAFETY COUNCIL

The tenth annual congress of the National Safety Council was held at the State House, Boston, September 26 to 30, inclusive. The Rubber Section held three morning sessions on September 27, 28 and 30, the first session being followed by a luncheon at which Harvey S. Firestone, president of the Firestone Tire & Rubber Co., was the speaker. The interesting program of papers follows:

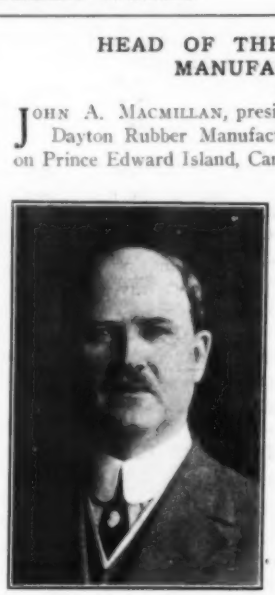
Tuesday, September 27. Address of welcome by the chairman, E. H. Fitzgerald, Federal Rubber Co., Cudahy, Wisconsin. "Standard Statistics of the Rubber Industry," Ray N. Watson, The Goodyear Tire & Rubber Co., Akron, Ohio. "Fire Hazards and Static Electricity in Rubber Plants," F. H. Hoxie, Associated Factory Mutual Insurance Cos., Boston. Round table discussion: "New Stunts to Promote Safety in the Rubber Industry, Including Conducting Safety Work at Minimum Expense."

Wednesday, September 28. "Safety from the Chemist's Standpoint," Dr. Lothar E. Weber, Boston. "Keeping a Rubber Factory Clean," William S. Jameson, The Fisk Rubber Co., Chicopee Falls. "Practical Plans for Medical Supervision in Rubber Plants," Dr. R. S. Quinby, Hood Rubber Co., Watertown.

Friday, September 30. Reports of Committees. "Safety from the Factory Manager's Viewpoint," C. B. Whittelsey, Hartford Rubber Works, Hartford, Connecticut. "Reclaiming Plants and Their Efforts Toward Safe Operation," John C. W. Baker, Rubber Regenerating Co., Naugatuck, Connecticut.

HEAD OF THE DAYTON RUBBER MANUFACTURING CO.

John A. Macmillan, president and general manager of The Dayton Rubber Manufacturing Co., Dayton, Ohio, was born on Prince Edward Island, Canada, forty-seven years ago. He was reared on a farm and educated at the Prince of Wales College, earning money teaching school to complete his college course.



John A. Macmillan

In the early nineties he went to Colorado, and in 1897 became western manager for the Equitable Life Assurance Society of New York, with headquarters at Denver, at that time being the company's youngest manager.

Through an investment in an airless tire Mr. Macmillan became interested in the rubber industry and about ten years ago went as general manager to The Dayton Rubber Manufacturing Co., then makers of mechanical rubber goods. He soon undertook the development of the Dayton airless tire, which was successfully placed on the market a few years later. In 1914 he became vice-president and in 1916, president of the company.

Mr. Macmillan is a director of the Dayton Savings & Trust Co., the Montgomery County Automobile Club, and president of the Civic Music League. He has served as president of the Dayton Rotary Club; chairman of the Board of Federated Charities; director of the Chamber of Commerce; director and treasurer of the Dayton Museum of Arts, and a member of the Citizens' Relief Committee, formed at the time of the great flood of 1913. Out of the latter organization has grown the conservancy project which has already expended nearly $30,000,000 for the prevention of floods in the Miami Valley. Mr. Macmillan is married and a member of the First Baptist Church, Dayton City, Dayton Engineers' and Country Clubs.

THE RUBBER TRADE IN OHIO

By Our Regular Correspondent

Throughout the Akron rubber industry there is a note of optimism which was little expected two months ago. The industry generally had resigned itself to the seasonal slowing up and believed that the middle of September would see this pretty well under way. However, when this time came instead of large numbers of men being laid off and production curtailed, the larger as well as the smaller companies continued to run in about the same way they have during the summer. Firestone, Goodyear and Goodrich have slackened their pace somewhat, but not to the extent expected. Good motoring weather throughout the United States has maintained the consumption of tires and repeat orders continue to come from dealers in every part of the United States.

Automobile manufacturers, instead of slacking up as expected, are expressing their confidence in the next few months' business by holding their commitments at last month's figures. They believe that Thanksgiving will probably see good business still coming to the rubber factories.

Last year dealers entered the winter months with large stocks of tires on hand and made every effort to liquidate during the winter. Spring found the dealers in need of goods. This winter is being entered with manufacturers' stock rooms and dealers' shelves practically bare as the result of the hand to mouth buy-

ing policy which has been universal during the entire year.

Automobiles will continue to be driven, and the same buying power which last winter absorbed the large stocks of tires will this year furnish production orders from day to day of about the same size, and this will mean better business for the rubber factories than last year.

The General Tire & Rubber Co., is one of the few companies in the whole country which is running ahead of the record year of 1920 in output. Up to the present time tire production is 25 per cent greater for this year than last, and indications are that the close of the year will continue to see the company that much ahead of 1920. Sales values are still running slightly behind last year. While they were $1,000,000 behind for the first half of the year, this has already been decreased to $600,000. The company believes that in spite of the decreased price of tires, the end of the year will see larger volume of gross sales than the previous year.

The smaller rubber companies also are more optimistic regarding the winter months than they have been. Many specialize in small size tires, and the opinion is now general that the demand will hold well through the cold weather. The India Tire & Rubber Co., Swinehart Tire & Rubber Co., and The Phoenix Rubber Co., are among those who are running their plants at very nearly capacity for one shift a day, and all hold the opinion that the next month or two will see little decline in their orders. Country dealers especially are giving the smaller companies orders at this time and it seems that the rural stocks are smaller than those in the cities.

Manufacturers of druggists' sundries are getting ready for a very brisk selling season. The fact that druggists generally have bought from hand to mouth during the past few months, and that their stocks are reported as unusually low, gives rise to the belief that the time has come for the sundries trade to show material increases. In Barberton, The Rubber Products Co. reports that its druggists' sundries department is operating at capacity and increased orders from now until the holidays are confidently expected.

Rubber heel production has continued on the same basis upon which it operated last year when 100,000,000 pairs of heels were made in the Akron rubber factories. The increase in sole sales, which was reported several weeks ago, has continued, and although the sole departments are not yet operating at the same peak as the heel departments it is believed that the next few months will bring up production in these departments also. The Goodyear Tire & Rubber Co. is planning to place a new sole on the market in the near future and this, it is believed, will greatly stimulate Goodyear sales of these products.

Mechanical goods departments are still operating about the same as a month and two months ago. The slight increase in general business and the new optimism felt in the steel industry and by the railroads has been reflected in mechanicals, more in inquiries, however, than in actual orders. These departments are more dependent upon the general business of the country than are tires and footwear.

EFFECTS OF INCREASED EFFICIENCY

The increased efficiency of the Akron factories has practically taken from the market the N. F. C. (not first-class) or "second" tires. All efforts by large buyers of these tires during the past several months have failed to obtain their usual supply. Every day sees some large buyer of "seconds" disappointed in Akron. This is due to the fact that employes are paying more attention to their work and producing very few tires which do not pass inspection. As a result, the smaller factories specializing in tires with names and serial numbers buffed off to be sold for "seconds" are working at peak production. Motorists who formerly depended upon "seconds" have also turned to regular tires for their cars because of the shortage.

A six-man gang in the curing room of one of the rubber factories recently set a new record by curing 700 tires in one day. The six men cured 35 heats of 20 molds to a heat, or nearly 135 tires per man during the regular eight-hour shift. This is just another example of the increased efficiency of the Akron factories, which has resulted from the general business depression and which has made the plants more than 50 per cent more efficient than a year ago.

TIRE FABRIC PRICES

Increased tire fabric prices resulting from increased cotton prices would materially aid the Akron rubber industry in recuperating this year the paper losses which they sustained because of inventory write-offs last year. Large stocks of fabric or commitments remain on the books of the companies and increase in prices will make possible carrying them at increased figures, which will counteract their being written down last year. On the other hand increases in prices of fabric will lessen the margin between the prices paid for fabric by the smaller rubber companies in the open market and the prices at which the large companies are carrying this stock. Because the small companies did not have the money or credit to load up with high priced fabric they were not caught as were the large companies with huge stocks.

It is interesting to note that although prices of tire fabric have receded from their peak of last year they have not yet reached the bottom of 1914, and it is doubted if they will. The fact that in 1914 fabric for cord tires was not quoted shows with what rapidity the cord tire has developed in the last few years. The following quotations are therefore interesting:

17¼-Ounce Builder Fabric	1914	1917	1919	1921
Combed Egyptian....*per pound*	$0.42	$0.96	$2.75	$0.63
Carded Egyptian.....	.39	.92	1.90	....
Combed peeler.....	.37	.86	1.90	.63
Carded peeler.....	.34	.80	....	.46
Combed Sea Island.....	.44	1.31	3.00	None for sale

Cord Tire Fabric	1918	1919	1921
Combed Egyptian....*per pound*	$1.27	$2.90	$0.66 ....
Combed peeler.....	1.10	2.05	.66 ....
Carded peeler.....	....	2.05	.55 ....
Combed Sea Island.....	1.55	3.15	None for sale

AKRON NOTES

The Firestone Tire & Rubber Co. reports that production during the first part of September was reduced to 25,000 tires a day from a peak production for the year of 28,000 tires a day. The seasonal decline in sales to both dealers and automobile manufacturers is given as the cause.

W. A. Johnston, president of The Rubber Products Co., and the Barberton Chamber of Commerce, has returned from a two months' vacation in Porto Rico.

The Reynolds Machine Co., manufacturer of rubber mill equipment, with main offices at Massillon, Ohio, will open a sales office at 48 East Exchange street, Akron, Ohio, with Dana E. Williams in charge. Mr. Williams has been connected with the rubber industry for more than twenty years, spending the last twelve with the Firestone Tire & Rubber Co., in charge of various departments.

Dana E. Williams

F. S. Griffin, for the past ten years assistant chief draftsman of the Firestone Tire & Rubber Co., has succeeded R. W. Rogers, resigned, as head of the machine design department of the University of Akron.

Dr. Marion M. Miller, formerly connected with the Goodyear material research department, has joined the staff of *The India Rubber Review* as an assistant editor.

Announcement is made of the appointment of C. G. Williams as manager of The McGraw Tire & Rubber Co.'s Cleveland branch, 4810 Prospect avenue. Mr. Williams, who has for some time been acting as assistant branch manager, succeeds D. C. Hathaway, who has now been made assistant sales manager. Mr. Williams was for many years identified with the automobile and tire industries of the Southwest.

George M. Sprowls, who has been in the experimental department of The Goodyear Tire & Rubber Co. for the past ten years, has left for Europe, where he will make a study of tire production and development. Before starting on his journey through France, Germany, Spain, Holland, Belgium, Switzerland, Norway, Sweden and Denmark, he will attend, September 23, the automobile show, which is the first show held in Germany since the outbreak of the war.

GEORGE M. SPROWLS

Mr. Sprowls is now on the staff of the factory manager and during the war rose to the rank of captain. He is a graduate of Washington and Jefferson College and the Massachusetts Institute of Technology.

Recent changes in the personnel of The Goodyear Tire & Rubber Co., Akron, Ohio, include the appointments of H. D. Hoskin and A. J. Blanchet as assistant comptrollers, and P. E. H. Leroy as assistant treasurer.

CLEVELAND NOTES

L. B. Timmerman, branch manager of the Cutler-Hammer Manufacturing Company's central district, at Cleveland, Ohio, has resigned and the resulting vacancy will be filled by Harry W. Eastwood, formerly with the Carnegie Steel Works at Youngstown, and later with the Electrical Controller & Manufacturing Co. of Cleveland, Ohio. Associated with Mr. Eastwood will be E. L. Windenburg as office manager. The company's central district comprises the Cleveland, Pittsburgh and Cincinnati offices and territory.

For the purpose of adopting new distributing policies for the coming year the annual sales conference of The McGraw Tire & Rubber Co., with managers present from all sales districts, was held in Cleveland, Ohio, September 13-16. Encouraging reports were rendered by the production and sales departments, which showed that sales of casings and tubes have been steadily increasing during this present year. Unfilled orders on hand greatly exceed those of 1920, and are sufficient to maintain factory operations at maximum capacity for some time to come.

On September 13 Manton M. Scott of Cleveland, Ohio, was appointed receiver for the Owen Tire & Rubber Co. The executive offices of this company, manufacturer of tires and tubes, are at 2336 Euclid avenue, Cleveland, Ohio.

The H. B. Bixler Co., headed by H. B. Bixler, consulting engineer for a large number of smaller rubber companies, and operator of a rubber factory laboratory at The Denmead Rubber Co., has suspended operations and the plant has been taken over by The Ohio Construction Co. The plant had been leased for a year. Mr. Bixler has become manager of The McWade Rubber Co., at Garrettsville, Ohio, it is reported.

THE TIRE & RIM ASSOCIATION

The Tire & Rim Association, an organization composed of tire, wheel and rim manufacturers, with offices at 535-537 Leader-News Building, Cleveland, Ohio, is at present governed by an executive committee, composed of the following members:

W. H. Allen, chairman, The B. F. Goodrich Co.
S. P. Thacher, vice-chairman, the United States Rubber Co.
J. D. Anderson, The Fisk Rubber Co.
W. S. Wolfe, The Goodyear Tire & Rubber Co.
J. C. Tuttle, Firestone Tire & Rubber Co.
Ford Lawrence, The Kelsey Wheel Co.

A. J. Willis is treasurer and C. E. Bennett general manager of the association.

MISCELLANEOUS OHIO NOTES

The increasing business of The Buckeye Reliner Producing Co., Lima, Ohio, has resulted in the doubling of the force of men employed, and has also made necessary the erection of an additional building, 110 by 110 feet, built of brick, and modern in every respect, to be used in the manufacture of tire reliners and tire accessories. The company specializes in giant cord reliners and shoes.

At the request of creditors of the Knox Tire & Rubber Co., Mount Vernon, Ohio, French W. Severns, of Mount Vernon, was appointed receiver by the Court of Common Pleas of Knox County. The assets of the company consist of a new plant of modern type, partially equipped for the manufacture of tires and tubes, and valued at $500,000. The liabilities are estimated at approximately $100,000. In the near future the plant and equipment will probably be offered for sale.

A. B. Clark and A. G. Ryley, receivers for the Gordon Tire & Rubber Co., Canton, Ohio, were recently granted permission to continue operation of the plant in accordance with a plan outlined by them. A creditors' committee joined with the receivers in asking for this order, and receivers' certificates of indebtedness to finance the proposed work were issued. The plant equipment is reported to be in good condition, and plans are now being made to resume work as soon as possible.

L. A. Swineford, the founder of the Mohican Rubber Co., having severed his connection with that organization, has organized the Quality Rubber Co., Ashland, Ohio, with the following incorporators: F. W. Saltzman of Akron, William Kurtz, C. E. Kurtz and L. A. Swineford of Ashland. The company has recently purchased a suitable building in Ashland with land adjoining for the erection of additional buildings when justifiable. The firm, which is incorporated at $50,000, will manufacture toy balloons, surgeons' gloves and other articles in the line of dipped goods.

At a recent meeting of the directors of the Tuscora Rubber Co., New Philadelphia, Ohio, O. M. Dickison was reelected president; W. T. Holliday, secretary, and E. L. Frantz, treasurer. Directors reelected were: O. M. Dickson, of New Philadelphia; E. M. Blatz, of Cleveland, and E. S. Weber, of Dover, Ohio. C. G. Frantz, E. L. Frantz and W. T. Holliday, of Cleveland, and Charles A. Kolp, of Canton, will serve as new directors. The company, which specializes in mechanical rubber products, has a factory at Dover, Ohio.

R. D. McWhorter, for two years in the treasurer's department of The Goodyear Tire & Rubber Co., has affiliated himself with the legal department of The Mason Tire & Rubber Co., of Kent. He is a National University Law School graduate.

The Mason Tire & Rubber Co. has evolved the idea of using large pneumatic tires on the Fordson tractor instead of the regular steel wheel, as they are easier on the machine and the driver. The tires are especially recommended where the tractor is used on solid surface roads. Several of the tractors with pneumatics are being tried out in various parts of the country.

MASON TO EXPAND

The Mason Tire & Rubber Co., of Kent, has announced plans to nearly double the capacity of its factory by the installation of new machinery by the first of the coming year. The present output is 2,200 tires a day and the new machinery will give the plant a capacity of 4,000 tires and tubes a day.

Additional buildings will not be required to take care of the new output as alterations in the arrangement of the factory will provide sufficient space. When the new equipment has been placed in production the capacity of the factory will have increased twenty-five fold since 1917 when the factory began operations.

The Mason company recently entered the original equipment field, and although the names of the companies have not been

announced, it is understood that several large orders have been received.

PLAN REORGANIZATION OF PORTAGE TIRE & RUBBER CO.

Press notices state that plans for reorganization of the Portage Tire & Rubber Co., Barberton, Ohio, are being considered. These plans include the naming of a new set of officers and the issuance of $1,000,000 in 8 per cent first mortgage gold notes. It is also proposed to consolidate the bankruptcy cases of the Portage Tire & Rubber Co., and The Portage Rubber Co., considering the two organizations as one. A stockholders' protective committee will arrange details regarding the refinancing and reorganization of the company. This committee consists of the following: E. A. Tinsman, Willoughby; Thomas Turner, Canton; G. M. Howenstine, Massillon; H. A. Rudd, Barberton; Harry Fife, Canton, and J. G. Firestone, Spencer; all in Ohio.

THE RUBBER TRADE IN THE MID-WEST

By Our Regular Correspondent

MID-WEST RUBBER MANUFACTURERS' ASSOCIATION

THE regular monthly meeting of the Mid-West Rubber Manufacturers' Association was held at the Missouri Athletic Club, St. Louis, Missouri, September 13, 1921, in conjunction with that of the directors and executive committee. Fifty-nine members and guests attended and the meeting was without doubt the most successful yet held by the association.

The principal after dinner speaker was Hon. Cleveland A. Newton, representative from the 10th Congressional District of Missouri. Congressman Newton's subject was "Taxation." He pointed out how difficult it is to reduce taxes with every branch of science, knowledge and industry knocking at the doors of Congress for appropriations. "It may be the proper function of government," he said, "to provide money for progress in various lines, but this money can only be raised by taxation and the business man should consider carefully before he signs a petition to Congress asking for an appropriation." At the conclusion of the address, on motion of S. J. Roy, of The Hannibal Tire & Rubber Co., by a rising vote the assembly expressed its appreciation and thanks to Mr. Newton.

Other speakers were J. F. Budd, Bibb Manufacturing Co.; A. W. Reid, Cabarrus Cotton Mills; John T. Williams, Collinsville Zinc Co.; C. T. Fogle, American Barytes Corporation; John T. Christie, The Hawkeye Tire & Rubber Co.; G. W. Sneed, Southern Acid & Sulphur Co.; Thomas Follen, Lion Tire & Rubber Co., and Edward G. Gereke, Gereke-Allen Carton Co. Mr. Gereke proposed that in coming meetings associate members hold a separate meeting under an organization that would be in touch with the secretary of the association. W. E. Wrisberg, Newson Valve Co., supported this proposition. President Wuchter expressed his approval of the plan and the next move is now up to the association members.

President Wuchter appointed E. T. Meyer, F. R. Henderson & Co., Chicago, chairman of a committee on arrangements and entertainment, for the next meeting which will be held in Chicago, October 11.

MISCELLANEOUS NOTES

J. E. Thompson, formerly treasurer of the Wisconsin Tire Dealers' Association and district representative for the Republic Tire Co., Milwaukee, Wisconsin, recently joined the sales staff of The General Tire & Rubber Co., Akron, Ohio. Mr. Thompson will have charge of the sales of the latter company's products throughout the State of Illinois. The Chicago branch of The General Tire & Rubber Co. is at 1923 Michigan avenue.

The Wildman Rubber Co., Bay City, Michigan, reports the recent appointment of Charles A. Brownell as vice-president in charge of sales, distribution and advertising. Mr. Brownell was formerly the publicity and advertising manager of the Ford Motor Co. The Wildman company will manufacture a complete line of tires and also the Wildman self-sealing pneumatic inner tube in its new factory, which will probably be ready for occupancy at the beginning of the coming year. Officers of the company are: W. W. Wildman, president; C. R. Twynham, treasurer, and James C. McCabe, secretary.

THE RUBBER TRADE ON THE PACIFIC COAST

By Our Regular Correspondent

RUBBER trade conditions in the Pacific Coast states are described by manufacturers, distributers, and retailers as quite satisfactory, even though profit margins may not be as liberal as a year ago. Volume of sales is well maintained in nearly all lines. Tires are holding their own remarkably well, the recent recovery being well sustained. Buyers seem to be convinced at last that they need expect no further slashing of prices. The building trades are very busy and they require a good deal of air and cement hose, and also other kinds of mechanical rubber goods. There is a good call, dealers say, for rubber and balata belting, and a considerable demand for radiator hose. The approach of cooler weather is marked with a better inquiry for druggists' sundries and rubber footwear, including heels and soles. Improvement is also marked in sales of repair stock of various kinds to vulcanizers, and a better demand is reported for insulated wire, soft molded and hard rubber goods, hospital sheeting, battery jars, tubing, printers' rollers, golf balls, and plumbers' rubber goods.

LOS ANGELES AND VICINITY

Production at the Goodyear Tire & Rubber Co. of California, Los Angeles, in the middle of September averaged 2,500 tires and 3,100 tubes daily, large sizes being in greater demand. In the rubber mill two shifts have been employed for many weeks, and the textile mills adjoining the tire plant are running well up to capacity. Stockholders in The Goodyear Textile Mills Co. were much gratified to learn recently that dividends would be resumed October 1.

The California Goodyear company's deficit as of July 31 was approximately $2,400,000. Operation from March 1 to July 31, however, showed a monthly profit averaging $200,000 available for interest and deficit reduction. Quick current assets on July 31, approximated $6,000,000, current liabilities $625,000, and cash balance about $1,000,000. F. A. Seiberling, J. S. Willaman, and J. R. Reilly have been replaced on the board of directors by E. G. Wilmer, G. M. Stadelman, and P. W. Litchfield. The latter three have also been elected to the board of directors of the Goodyear textile concern, taking the places of F. A. Seiberling, S. A. Steere, and C. N. Turner. The more favorable position of the tire and textile concerns was reflected lately in a sharp rise in the prices of the stock issues.

The Southern California Metal & Rubber Co. has bought an acre of land on the west side of Santa Fe avenue, between Eleventh and Fifteenth streets, Los Angeles, and has begun the erection of several substantial buildings as well as the installing of a spur of track.

The Howe Rubber Co. of California has been incorporated in Los Angeles by C. A. Mullen, Edgard G. Pratt, G. Harold Janeway, Frank M. Gunter, and H. C. Beach, with $10,000 capital.

The Boston Woven Hose & Rubber Co., through its Pacific coast branches, has been making a strong campaign for ⅝-inch garden hose, contending that it is more scientific and efficient for general service than either ½-inch or ¾-inch hose: and its representatives say that a strong impression has been made in this regard on retailers, as evidenced by many large contracts for 1922 delivery.

Good progress is being made in the building of the first unit of the factory of The National Airless Tire Co., at Norwalk,

California. The building, which occupies part of a 3-acre plot, will be three stories high and is planned for an ultimate capacity of 1,000 tires daily. As soon as the first story is finished machinery will be installed for producing 150 tires a day. The company has an authorized capital of $1,000,000, and its officers are: O. A. Lane, former mayor of Glendale, president; H. D. Smith, vice-president; C. F. Evans, treasurer; and C. H. Braden, inventor of the tire, who is also secretary and production manager. The company has temporary offices in the Grosse Building, Los Angeles.

The Pacific Tire & Rubber Manufacturing Co., with an authorized capital stock of $2,000,000, has been incorporated in Los Angeles. The directors are Dr. C. E. Calm, William B. Wightman, J. B. Treadwell, Owen C. Emery, and W. O. Bruess.

SAN FRANCISCO NOTES

C. H. Muller has been appointed Pacific Coast representative of The Howe Rubber Corporation, New Brunswick, New Jersey which, since Otis R. Cook has become president and taken entire charge of distribution, has taken over The Howe Rubber Co., of California, with main offices in San Francisco and Los Angeles.

The San Francisco branch of the Niagara Sprayer Co. is now at 283-285 Minna street, with F. A. Frazier in charge as the western representative. The main plant of the company is at Middleport, New York, where Niagara sulphur is manufactured for the rubber trade.

The West Coast Rubber Corporation, Inc., with an authorized capital of $2,000,000, has been incorporated in San Francisco to manufacture Bonner tubes. The directors are C. L. Williamson, F. C. Jordan, W. F. Peterson, W. W. Felt, Jr., R. Sandford, and J. W. McClatchie. The company's offices will be at 33 Dolores street, San Francisco.

L. G. Lehousse, one of the oldest tire men on the Coast, has been appointed as Pacific Coast tire representative of The Quaker City Rubber Co., Pheladelphia. He has opened offices in the Williams Building, San Francisco.

Despite a general dullness in the mining industry, which now appears to be passing, a good demand for pump packing of rubber, asbestos, and other material is reported by the San Francisco branch of The Garlock Packing Co., United States Rubber Co., New York Belting & Packing Co., the Raybestos, and other concerns handling such goods. An excellent demand from the oil companies has been a recent feature, although a strike affecting many of the so-called independent concerns is likely to lessen sales somewhat. The packing men all report general sales fully up to the level of a year ago.

S. L. Schwartz, president of The L. H. Butcher Co., San Francisco and New York, sailed September 1, from San Francisco, as one of a delegation of fifty members of the Chamber of Commerce on a tour of the Orient for the purpose of binding more closely existing commercial relations.

PORTLAND NOTES

The Columbia Tire Corporation with an authorized capital of $3,000,000, will erect a factory in Portland, Oregon, at a cost of $250,000, with a capacity of 500 tires daily. R. A. Wurzburg, for several years with Kelly-Springfield in Akron, and later efficiency engineer for The Ideal Rubber Co., Cleveland, will head the new concern. Lewis Wyman, of Minneapolis, will be sales manager, and K. C. Mohrhardt, of Berkeley, California, will be secretary. Temporary offices have been opened in the Northwestern Bank Building.

Following a lively demand for its products, the Portland branch of The Spreckels "Savage" Tire Co. is running almost to capacity. G. T. Cummings is in charge. The new depot was recently opened by Pacific coast district manager, A. C. Lester.

The first anniversary of the opening of The Perfection Tire Co.'s building at Tenth and Stark street, Portland, Oregon, was celebrated recently by that concern, which entertained the entire staff at a local pleasure park.

SOUTHWESTERN NOTES

Business is reported good by The Spreckels "Savage" Tire Co., of San Diego, California, which has now 700 men making high-grade fabric and cord tires. Founded eleven years ago, the concern early came under the control of John D. and A. B. Spreckels, capitalists, of San Francisco and the Hawaiian Islands, and ever since has been scoring well in the Pacific Coast and export trade. Two recent appointments were A. C. Lester as Pacific Coast district manager, with headquarters in Los Angeles, and The Howell-Swift Tire Co., as general agents for western Oregon and the Columbia river counties of Washington, with offices at 445 Stark street, Portland, Oregon.

J. B. Magee, Southern California and Arizona branch manager for the United States Rubber Co., has been spending several days looking over the territory in and about San Diego.

CANADIAN NOTES

A VERY encouraging report has lately been received from the K. & S. Tire & Rubber Goods, Limited, 99 Paton Road, Toronto, Ontario. For the first six months of 1921 the sales of tires and tubes showed an increase of 23.7 per cent over a corresponding period for the year preceding. July sales showed an increase of 137 per cent over July, 1920, while August sales for this year practically doubled those for August, 1920. Officials of the company believe that this most satisfactory growth is due to the excellent quality of the goods manufactured, and also to the aggressive policy instituted by its salesmen. Branches of the K. & S. Tire & Rubber Goods, Limited, are at Montreal, Hamilton and Winnipeg.

W. H. Alderson, manager of the Ontario division of Gutta Percha & Rubber, Limited, 45 Yonge street, Toronto, Canada, is now president of the Toronto Board of Trade. Mr. Alderson has previously served upon this board as treasurer.

CANADIAN MEETING OF THE SOCIETY OF CHEMICAL INDUSTRY

The annual meeting of the Society of Chemical Industry was held at McGill University, Montreal, Canada, August 29, at which over 225 members of the society were registered. Among the papers presented was one of interest to rubber chemists, "Some Observations on the Chemistry of Rubber," by Professor G .S. Whitby, who touched on a variety of points of interest in the researches which he and his coworkers have recently conducted at McGill University relating to the chemistry of raw rubber and the vulcanization of rubber.

He described an investigation of the resin of rubber, which represents the first successful attempt to elucidate in some degree the problem of the chemical nature of a constituent of raw rubber which, although present in only a small proportion, has an important influence on the behavior of the rubber when the latter is vulcanized and in other ways.

Dr. Whitby's investigations show that a considerable number of crystalline substances can be isolated in small amounts from raw rubber. One of these substances is an interesting sugar-like body, which was known to occur in rubber latex but the presence of which in prepared rubber was unexpected, on account of its great solubility in water.

Experiments were described on the artificial conversion of rubber into a resin as a result of the absorption of oxygen from the air under the influence of catalysts. One mode of carrying out this conversion which Dr. Whitby has worked out may lead to the production of lacs or varnishes from rubber. The study of this conversion is also of importance because of its relation to the "perishing" of rubber goods.

The Rubber Trade in Great Britain

By Our Regular Correspondent

A general, though only slight, revival in trade is noticeable and a good many departments of rubber manufacture are participating in it. Especially is this the case in the waterproof branch, which has benefited by the break in the drought at the end of July. Large stocks which have been on hand for many months have been mostly cleared and proofers have had new orders for immediate delivery. Buyers do not generally seem to appreciate the fact that cloths which are obtainable at low prices at the present time, owing to the stress of circumstances, will probably rise in price as trade improves, large parcels of goods having been sold at under the cost of production. There is certainly an improvement in the tire trade, but those who anticipate anything in the nature of a boom must remember that the effect of the latest taxation of cars has been to cause many owners of two or more cars to lay some of them up or only to pay the tax for a short period of the year, thus reducing the demand for tires. Again, it is certain that pleasure motoring will be affected next year, if not the last of this, by the passing of dividends in industrial concerns.

THE RUBBER GROWERS' ASSOCIATION SCHEME

It is interesting to note that shareholders in planting companies are to be consulted with regard to the policy to be pursued in the present crisis. At least this is the case with the Perak Rubber Plantations. It is held by many that the perilous condition of many of the companies is due to a considerable extent to the policy of distributing profits up to the full and capitalizing reserves with too little regard for the possibilities of future setbacks. Despite the fact that during the last six or seven years the area under cultivation had increased by 7 per cent yearly, while the output of rubber had gone up by 22 or 23 per cent yearly, overproduction was not seriously thought of any more than the present depression in trade had been anticipated by business men generally. It may be taken that the conflict of opinion among directors of companies as to the expediency of curtailing production systematically will be reflected in the plebiscites to be taken by shareholders, and unanimity need not be expected.

An important part of the whole business is that with the bulk of the rubber being produced by Britain and sold to America, international finance is largely concerned, a fact which is not recognized by all shareholders. It has been pointed out authoritatively that, supposing in a normal year America took 250,000 tons of rubber at 2 shillings a pound, this would mean an outlay of £56,000,000, and each penny fluctuation in the price would represent £2,333,333, a figure which would have some appreciable relation to exchange considerations. Some fear is being expressed that American interests may succeed in getting hold of many estates at bankrupt prices unless something drastic is done at once to remedy a condition of affairs which can only be described as perilous. It is recognized that America will not pay more than she is obliged to for her rubber and the reported large purchases in the Far East have caused some perturbation in London.

PITCH HYDROCARBONS

Dr. Dannerth's article in the August issue of The India Rubber World on "Pitch Hydrocarbons Used in the Rubber Industry" has been read with interest, particularly the detailed methods of testing. Such detail is very necessary because there is no standard system of testing generally adopted, and even in a pitch works where the tests for melting point and twist point are closely defined, it is customary for all the work to be done by some selected operator to obviate differences due to the personal equation. I note that in the table showing properties of the principal pitch hydrocarbons the figures for coal-tar pitch are, free carbon 40 per cent, and melting point, 149 degrees C. This, of course, refers to a very hard pitch, and though an earlier mention is made of soft pitch, no definite figures are given.

That there is so much difference in the coal-tar pitches produced in this country, and that there are perceptible variations in the accepted grades of soft, medium and hard, is probably not generally within the knowledge of rubber manufacturers. I have heard some of them say that they have tried pitch for this or that purpose and it did not suit. Perhaps they tried a hard pitch with the figures given above when they really wanted one with 10 to 20 per cent free carbon and 70 to 80 degrees C. melting point, or vice versa. It is the smell of coal-tar pitch which has always been against its use by rubber manufacturers, otherwise, now that it has fallen in price from the war figure of £10 a ton to about £2, it could easily compete with the other pitch hydrocarbons. I note the suggestion that the free carbon in pitch might be useful to the rubber manufacturer, if it existed up to 50 per cent. It would still, however, be necessary to get rid of the pitch before the rubber manufacturer would be attracted. By the way, has it been proved that the so-called free carbon in coal-tar pitch is really carbon, or is it a hydrocarbon like many lamp blacks?

SOME RECENT PATENTS

A new use for hydrofluoric acid will be welcomed by the manufacturers of this disagreeable substance, and such a use has been patented by Christian H. Gray, of the Silvertown works, London. Raw rubber containing mineral impurities is to be treated in the partially washed state and in the form of thin sheets with a solution of hydrofluoric acid of strengths varying from 8 to 30 per cent. By this means the mineral impurities—obviously admixed sand—are dissolved out and the acid is afterwards removed with water or a dilute solution of alkali. It is stated that wet rubber or gutta percha can be treated with gaseous hydrofluoric acid. The idea seems to be entirely novel, but presumably Mr. Gray satisfied himself that it would work to advantage before applying for a patent. It would be interesting to know how the cost compares with the ordinary washing process of removing admixed sand. In these days of plantation rubber one would have thought that sand as an impurity was not very much in evidence.

Two recent patents taken out by A. A. Crozier, of the Revolite Co., Limited, Bradford Road, Manchester, have hardly the same degree of novelty as that just mentioned. In one case he uses a solution of deresinated gutta percha in carbon tetrachloride for attaching rubber soles to leather boots, an important matter being a preliminary abrasion of the surfaces. Various cements have already been used for this purpose, but carbon tetrachloride has the advantage over carbon bisulphide, benzol, etc., in that heat can be used in the attaching process, as it is non-inflammable.

The other patent refers to a new or improved black rubber compound of heel pads, etc., which will not bloom. Improvement rather than novelty seems to be the main point, as the blackness is attained by the use of black tire scrap, black rubber spewings and carbon black, lampblack, or other black pigment. A low proportion of sulphur and a rather large amount of magnesium oxide are other characteristics.

POWDERED MICA

Under the name of Mintite this material has been patented by Louis Minton of Trevelyan Buildings, Manchester, for use as a new finish for single texture proofings, such as waterproof and bed sheetings. It is intended to replace farina and its kind, which are organic bodies affected by moisture and acids, whereas the powdered mica is quite unaffected. The mica is a white powder

in a very high state of subdivision and has the same appearance as farina. It associates readily with rubber and is applied by the same machinery as is customarily used for farina. Quite a good polish is given to the rubber surface by its use and this is obtained more easily and more cheaply than with spirit or other varnishes. I understand that although it is heavier than farina, yet a certain weight will cover four times as much surface as farina. Another use has been found for the material in replacing French chalk in the open cure of mechanical goods where a polishing effect is a desideratum.

RUBBER SHAREHOLDERS' ASSOCIATION

The Rubber Shareholders' Association, limited by guaranty and with an annual subscription of 10*s.* 6*d.*, has been formed, and a provisional committee, which is working voluntarily, is now engaged in completing its organization. A meeting is to be held shortly when the main objects of the association will be discussed. These are as follows: (1) To organize opinion among shareholders of rubber planting companies regarding schemes of control, and for a restriction of output; (2) To collect information, prepare statistics, systematize accounts, etc.; (3) To promote the interests of members and to endeavor to safeguard and protect the capital invested in the rubber planting industry; (4) To undertake any propaganda work in connection with the industry and its development, and to pay therefor, and to cooperate with or assist any other body or association in such propaganda.

We already have a railway shareholders' protection society and if the idea spreads it would seem that the directors of companies generally will have rather a different status in the future than they have had in the past.

TRADE FINANCE

There is a good deal of speculation rife as to how our leading rubber firms have weathered the trade depression. Although some of the concerns are public limited companies whose results become the property of the newspaper reader, more of them are private companies whose financial results are kept under lock and key, so to say, and it would not be journalistic etiquette for those writers who happen to be in the know to comment on what has not been published. There is no reason to suppose, however, that the private companies have been engaged in amassing fortunes while the public companies have been struggling to make ends meet.

The Isleworth Rubber Co., Limited, Middlesex, which has made such good progress in recent years from small beginnings, shows a loss for 1920 of £105,723 and a debit balance of £95,871 has to be carried forward. The shareholders are to be asked to subscribe to 50,000 of the unissued shares as 10 per cent cumulative preference shares of £1 to rank over existing shares.

Considering the state of the waste rubber market the statement that S. B. Harrison & Co., of Newington Green, London, has failed with liabilities of £15,600 and no assets, will cause no great surprise, though in fairness to the waste rubber trade it should be stated that the firm ascribes its losses to be entirely due to business in rabbit skins, which, as far as I know, are not in urgent request by rubber reclaimers, whether they happen to be busy or slack.

In the important waterproof concern of Burberry's, Limited, which was floated as a public company in 1920 with a paid-up capital of £2,000,000, a scheme is shortly to be proposed for the reconstruction of capital and the raising of fresh funds. The company, like many others, appears to be faced with a considerable loss with its large holding of stock in the form of waterproof and cloth goods, and the venders have agreed to surrender a considerable bulk of ordinary shares allotted as part purchase consideration.

OFFICIALS OF THE JOURNAL KNOWN AS *Tropical Life* ANNOUNCE that, owing to rebuilding, the address of the publication will be changed from 112 Fenchurch street, London, E. C. 3, to 5 Great Tower street, London, E. C. 3, England.

WITH GEORGE KNOWLES AS MANAGER AND DIRECTOR THE FIRM OF George Knowles & Co., Limited, 149 Leadenhall street, London, E. C. 3, England, has begun operations as crude rubber merchants and importers. Mr. Knowles has been associated with the rubber industry for many years, and was until recently a member of the firm of Stern & Knowles, of London and Liverpool.

FOREIGN TARIFFS

AUSTRIA

A LAW which became effective July 16, last, regarding a revision of recent tariff duties, contained a further list of goods imported into Austria upon which payment of customs duties must be made on a gold basis, or at 100 times the nominal rates when paid in banknotes. Among the dutiable articles mentioned the following were noted:

Tariff No.	Articles
310	Children's toys of soft rubber.
312	Wares of soft rubber, not specially mentioned.
314	Wares of hard rubber, not specially mentioned.
317	Clothing and other made-up articles of tissues coated, etc., with rubber, and of elastic tissues, etc., of Tariff numbers 315-16.
318	Wares of rubber combined with very fine materials.
319	Wares of rubber mounted with precious metals.
ex 320	Tires (inner tubes and outer covers).

GERMANY

A proclamation, effective August 1, modifies former prohibitions and permits the exportation from Germany of certain articles without license. The following item was noted as coming under this head:

Tariff No.	Articles
ex 919 ex 920	Parts of cycles (except motive machinery and parts thereof), of iron, or other common metals or alloys thereof, wood, cork, hard india rubber, horn, leather, or celluloid or moulding materials similar thereto—in consignments weighing up to 350 grammes net.

Other articles, included under tariff numbers ex 582-586, had reference to hard rubber and wares of hard rubber except spectacle frames. Amendments in regard to these latter goods became effective July 11.

UNION OF SOUTH AFRICA

The Excise Duties Amendment Act of 1921, which in turn amended the Customs Tariff Act of 1914, increases some of the customs duties of the Union of South Africa. The present Act provides, on the other hand, that, subject to regulations, the Governor-General may declare that:

There may be allowed a refund of the whole or any part of the customs duty that would otherwise be payable under the Customs and Excise Duties Act, 1920, on (1) rubber-proofed materials, in the piece, made of cotton, hair, silk, or wool, or mixtures thereof, when imported by manufacturers of waterproof clothing for the purpose of making such clothing; and (2) the following materials used in the manufacture of rubber:

Pigments, filling agents and vulcanizing accelerators; zinc white, zinc sulphide, antimony sulphide (yellow and red), alumina, magnesium carbonate, calcined magnesia, lithopone, vegetable black, carbon black, Prussian blue, white lead, ebonite powder and emarex (natural pitch); in bulk.

Rubber substitutes, vulcanized vegetable oils, in bulk.

Rubber compounding oils, aniline oil, resin oil, and vaseline in bulk.

Rubber solvents, benzine (benzol), coal tar, naphtha, westrosol, westrom, carbon disulphide, in bulk.

Vulcanizing agents, sulphur chloride, in jars of not less than one imperial gallon.

HUNGARY

A decree dated July 13, and forwarded by the High Commissioner at Budapest, has reference to securing licenses before certain goods can be imported into Hungary. Among articles mentioned the following were noted:

Tariff No.	Article
309	India rubber wares made of patent sheets not specially mentioned.
ex 311	India rubber heels for footwear.
312	Articles of soft rubber not specially mentioned.
313–4	Hard rubber sheets, rods, or tubes; wares of hard rubber not specially mentioned.
ex 320	Tubing of or combined with india rubber, with or without layers of tissues or inlaid ware; fittings for technical or electrotechnical purposes, for instruments, etc., of hard india rubber.

THE RUBBER TRADE IN EUROPE

By Our Regular Correspondent

O. ENGLEBERT FILS & CIE.

Among the important rubber manufacturing companies of Belgium is O. Englebert Fils & Co., a limited joint stock organization with offices and main plant at 3-11 rue des Vennes, Liège, and branch establishments and agencies in all countries. The company employs 3,000 workers, and manufactures pneumatic tires and tubes for automobiles, motor cycles and bicycles; waterproof garments; rubber soles and heels; rubber belting, tubing, valves, etc. Oscar Englebert is managing director of the company, and Georges Englebert is commercial director.

SWITZERLAND

The Pirelli company of Milan, Italy, has established a branch at Zurich, Switzerland, to sell Pirelli products and manufacture rubber and gutta percha goods; also wires and cables. The capital is 200,000 francs. The directors are Pietro Pirelli, Milan, president; Carl J. Brupbacher, Wädenswil; Oskar Dollfus, Castagnola; Philipp Frangialli of Florence is the manager.

TIRE TRADE IN EUROPEAN RUSSIA

Statistics have been compiled by the Research Division Bureau of the United States Department of Commerce regarding articles exported by this country to European Russia during recent years. Automobile tires, which constituted one of the items mentioned, have a value, it will be observed, which is very fluctuating. The totals are:

	Automobile Tires		Automobile Tires
1915	$263,838	1918	$211
1916	944,261	1919	1,402
1917	162,214	1920	13,569

European Russia, it must be remembered, includes Soviet Russia, the Caucasian Republics, the Ukraine, Lithuania, Latvia, and Esthonia. Finland is not included in any of the figures given; nor Russian Poland after December 31, 1919.

REVIEW OF GERMANY'S RUBBER TRADE

A review of Germany's rubber trade during 1920 and 1913 shows what efforts Germans are making to regain their former position and how far behind it still is.

Germany's net imports of rubber, gutta percha, balata, crude and refined, amounted to 126,621 quintals in 1920. A quintal equals 220.46 pounds. Besides this there were imported 34,813 quintals of waste; the exports of rubber substitute exceeded the imports by 1,746 quintals. As compared with 1913, this means a decrease of 21 per cent for rubber, 86 per cent for gutta percha and 57 per cent for balata.

In 1913, exports of waste exceeded imports by 5,500 quintals, while in the case of substitutes imports were higher than exports by 1900 quintals. Considering that in 1920 a smaller area had to be supplied with raw materials, these imports may be said to have been practically up to the level of 1913.

The sources of supply in 1920 were chiefly the Dutch East Indies, British East Indies, Africa and Brazil, while in 1913, these were, first Brazil and then British East Indies, Kamerun, Belgian Congo and Mexico. Gutta percha came chiefly from the Dutch colonies as did balata. In 1913 Venezuela was the chief source of balata imports. France was the chief exporter of waste, then followed Great Britain—a poor second—and finally Italy, Switzerland and the United States. The reexports of crude rubber went to Czecho-Slovakia and Austria.

Exports of rubber goods in 1920 were 31,132 quintals against imports of 20,611 quintals; the ratio of exports to imports was 3 to 2 as compared with 5 to 1 in 1913 when exports amounted to 197,000 quintals and imports were 42,000 quintals. On account of the low rate of the mark the value of the 1920 exports was more than double that for 1913, the respective totals being 295,800,000 marks and 128,300,000 marks. The very low figure for exports of rubber goods was partly due to the fact that the export trade in this line was still practically dead during the first part of 1920.

The situation in tires and tubes in 1920 was the reverse of that in 1913. In the former year imports were 12,697 quintals, exports only 4,823 quintals, while in 1913 exports were 68,000 and imports 9,600 quintals. France, United States, Belgium and then Great Britain and Denmark were the chief suppliers in 1920.

The 1920 exports and imports of belting, rubber press cloths and card clothing were about equal, exports amounting to 2,169 quintals or 16 per cent of the 1913 total. About half the imports came from Great Britain and France.

Comparatively large quantities of wagon covers and other rubbered fabrics were exported, chiefly to the Netherlands which seems to be acting as intermediary for other countries. Italy also took large quantities of these goods. On the other hand, France and Great Britain participated chiefly in the imports, which were half as high as the exports.

Figures concerning rubber footwear, balls, erasers, rubber plates combined with fabric, show favorable development of production. For if 1920 exports were only a quarter of those for 1913, imports were only a quarter of exports. Evidently, home production practically covered home needs. Whereas, Great Britain imported 11,000 quintals of rubber plates from Germany in 1913, she does not appear on the 1920 list. Neither Russia nor the United States appeared as buyers of rubber footwear. Most of the imports came from France which sent 1,051 quintals as compared with 165 quintals out of a total of 6,000 quintals in 1913.

Only 1838 quintals of hard rubber and manufactures of hard rubber were exported. About 200 quintals went to Great Britain, and similar amounts to the Netherlands and Sweden. Smaller quantities were imported by Spain, Denmark, Austria and Switzerland. Imports into Germany were insignificant.

As the *Gummi-Zeitung* points out, though the Entente countries—particularly England and France—figure as important suppliers to Germany, they are not specially mentioned as importers of German goods, only very small quantities of goods being imported into these countries.

FOREIGN GOODS

Recently the Association of the German Rubber Industry reported to the Government that the Import and Export Bureau at Ems had issued import permits for foreign rubber goods valued at 55,500,000 marks, from the end of April to July 28. Of this amount there were nearly 53,000,000 marks' worth of automobile and bicycle tires, tubes and covers. Offers were under consideration for the import of 20,000,000 marks more, of which French and Belgian automobile tires valued at 3,000,000 marks were for the account of one foreign house in Cologne.

Then the value of the decision to abolish the sanctions has been considerably lessened by certain provisions which insure to France, Belgium and England unhampered importation of their goods into the Rhine territory.

RECONSTRUCTION WORK FOR FRANCE

Now that business is dull, many manufacturers are looking forward to orders for reconstruction work for the devastated regions in France. It is understood that the German Government would make good the amounts involved; however, much depends upon the terms of payment the Government is willing to make, and the keen competition that would follow.

SPONGE RUBBER TOYS

Many stores here are selling sponge rubber toy novelties. Among these toys, which are cheap and appear to be quite popular, one sees queerly fashioned animals, teddy bears, large and small dolls, rats, harlequins, etc.

NEW GERMAN FIRMS

Arnold & Schneiderheinze G. m. b. H., Leipzig; manufacture

of rubber goods and trade in raw materials and manufactures of the rubber industry as well as the manufacture and sale of similar and allied goods.

Märkische Gummiwaren-Fabrikation Heinz Schlüter, Berlin.

Dr. Triebel & S. Halperin G. m. b. H., Berlin-Grunewald; export and import of goods particularly with the former Russian states and especially in rubber shoes and other rubber goods manufactured by the Mannheim branch of the French firm Etablissements Hutchinson, Paris.

Steirische Gummi-Handelsgesellschaft m. b. H., Gratz; trade and commission business in rubber tires for all kinds of vehicles, in technical rubber goods, all kinds of mounting tools and motors for vehicles.

Sichel & Schröder, G. m. b. H., Cologne; sale of rubber heels, the product of the Santo company, Berlin.

Crol & Schröder G. m. b. H., Berlin; manufacture and sale of machinery and all kinds of technical goods.

Freyer & Mögel, Dresden-A., wholesale dealing in surgical and technical rubber goods; factory for foot-ball covers of the mark "Golo."

GERMAN NOTES

The F. Troitsch Seil- und Kabelwerke, Tempelhof, has been reorganized and from an open partnership has become a limited liability company which will operate under the name of F. Troitsch Seil- und Kabelwerke G. m. b. H. Manufacture of general metal wares will be undertaken besides that of cord and cable. The capital is given as 2,000,000 marks.

The Niedersheinische Gummiband Weberei, G. m. b. H., Brevell near Lobberich (Rhld.) has been dissolved.

During July three fires occurred at the works of the Vereinigte Gummiwaaren-Fabriken Harburg-Wien, vormals Menier-J. N. Reithoffer, Harburg. Fortunately none of the fires was serious enough to interrupt operations. It is believed that the fires were caused by incendiaries.

The Veith-Werke Akt.-Ges., Landbach (bei Hächst) has doubled its capital by the issue of 3,500,000 marks common stock and 500,000 marks preferred stock. The company's prospects are good.

FIRESTONE'S BUENOS AIRES MANAGER

The Firestone Tire & Rubber Co., Akron, Ohio, has recently announced the appointment of J. P. Patterson as the manager of its Buenos Aires branch. South America is becoming a field of increasing importance to the tire industry, and there have been many developments there since the Firestone company established its Buenos Aires branch in 1915. Mr. Patterson has held in the United States positions of responsibility in the service of the Firestone Company, while, as a Spanish War veteran, he is familiar with the Spanish language and customs.

BRAZILIAN EXPORTS OF RUBBER DURING 1920

The amount of rubber exported from Brazil during the twelve months ended December, 1920, and the principal countries of destination were as follows: Total amount of rubber exported: 23,531 tons. The principal countries of destination were: United States, 13,609 tons; United Kingdom, 6,989 tons; France, 1,305 tons, and Germany, 622 tons. The chief ports of shipment were: Manáos, 11,678 tons, and Pará, 10,931 tons. Compared with the year 1919 there was a decrease of 9,721 tons.

SOUTH AFRICAN MOTOR TRADE

In a recent report concerning the economic and financial condition of South Africa attention is drawn to the figures in connection with the motor industry. During the year 1920 £7,000,000 were spent in importations of motor cars, motor bicycles, tires, fuel and lubricants. America's share in this South African trade is estimated at £5,500,000. Total imports from the United States of all classes of goods equaled, for 1920, £17,000,000, against £11,250,000 in 1919 and £6,250,000 in 1917.

THE RUBBER TRADE IN THE FAR EAST

By Our Regular Correspondent

MALAYA

THE interest with which local planters regarded the visit of Mr. Duncan and three other representatives of local planting interests to the Netherlands East Indies for the purpose of discussing cooperation in a scheme of restrictions and sales control, was abundantly manifested by the large attendance at a meeting in Kuala Lumpur where Mr. Duncan, newly returned from Java, gave an account of what he had accomplished.

While the members of the Dutch deputation which he met in Java by no means represented the whole of the planting interest, the result was so encouraging as to make him think that the Dutch would go to their Government suggesting action. Mr. Duncan, on his return to Singapore, saw the governor who was not displeased with the result of the deputation's visit. Mr. Duncan saw the Chief Secretary and the Colonial Secretary, but was not at liberty to say what was said. But the Governor authorized him to say that he was now in communication with the Colonial Office. To Java Mr. Duncan wired what His Excellency was doing and suggested the same action would be advisable there.

THE RUBBER MARKET

About the middle of July prices began to rise and sheet was quoted at 34 cents and crêpe 37 cents with further rises probable. The market was very excited. This seems to have been due to the report of the agreement between Malayan and Dutch planters and to the latest scheme of the Rubber Growers' Association. A further rise is expected before the end of the month. A large amount of rubber is changing hands.

Japan is again in the market for low grades, and England, America and Germany are buying steadily but quietly. The rubber market evidently accepted the possibility of further restrictions. "Bears" were anxious to cover, speculators bought, sellers held off. While some expect a further rise, others predict an early reaction.

POSITION OF COMPANIES

Pulau Bulang, the $4,000,000 enterprise started eleven years ago, has collapsed. The property is to be put up at auction and it is not considered likely that the highest bidder will pay enough to redeem the liabilities of $600,000.

It is known that many other dollar concerns are in difficulties and under the present conditions it will doubtless not be long before some of these too will break down completely.

It is pleasant to turn from companies like the above to some that are financially strong enough to be able to pay dividends. Thus Kuala Selangor, which is a cheap producer, has earned about 30 per cent and declares a 25 per cent dividend. Two Hamilton companies, Cheras and Sungei Purun are also in the fortunate position of being able to turn out a dividend.

Sungei Purun has made a profit of 20 per cent and will distribute 7½ per cent, after payment of which it will have a balance in hand of about £10,000. Cheras will be in the same financial position after also paying 7½ per cent in dividends.

The Windsor (F. M. S.) Rubber Estate Limited, reports a very sound financial condition. Their forward sales for this year's crop are 257,600 pounds at an average gross price of *2 s.* 4.09 *d.* a pound and they have a contract for 73,920 pounds at *2 s.* 7½ *d.* a pound against 1922 crop.

THE NETHERLANDS EAST INDIES

The International Association for the Rubber Industry in the Netherlands East Indies has informed its members that the results of the circulars sent out on July 11 and 25, 1921, concerning the formation of a Rubber Producers' Corporation were as follows:

1. In favor of 50 per cent restriction and sales control—Dutch capital, 20,100 acres; French capital, 13,800 acres; English capital, 48,900 acres; total, 82,800 acres.

2. In favor of 50 per cent restriction but against sales control—Dutch capital, 5,520 acres; Belgian capital, 35,790 acres; Swiss capital, 3,510 acres; English capital, 1,438 acres; total, 46,258.

3. Against restriction and in favor of sales control—Dutch capital. 947 acres.

4. Against both restriction and sales control—Dutch capital, 107,874 acres.

No answer was received from 206,922 acres. It is said that of this, 168,600 acres were British owned and that among these were forty British companies including some of the best known, such as United Serdang, Anglo-Dutch, Sialang and Tandjong.

From the above it will be seen that the majority of Dutch owned estates were against the proposition. This result was not entirely unforeseen, for from the outset Dutch concerns were not generally in favor of restriction and a strong section are still vigorously opposed to it. Where restriction is concerned producers seem to be divided into three groups—those that are frankly in favor of it; those that hesitate, really incline to opposition but could be won over if they could be made to see the practicability of a scheme for the purpose of reducing output; and lastly those that are uncompromisingly against it.

AMERICA AND THE RUBBER CRISIS

The United States is used by both those for and against restriction as a strong argument in favor of their side of the question. Indeed, very few discussions about the rubber situation in the East are complete without some kind of reference being made to the action America is taking already or is about to take. Thus the *Sumatra Post* considers that there may be something in the opinion that the present rubber crisis is chiefly due to American speculation, as well as in persistent rumors that Americans are trying to extend their influence on the East Coast of Sumatra.

It is said that efforts are being made by Americans to get control of three-fourths of the rubber production on the East Coast. It seems that the policy is to furnish money on very good conditions to concerns that are hard pressed and then later to seize the concessions which serve as security.

The name is known of a big American concern which, it is said, has sent two representatives to Medan for the above purpose. If, says the *Sumatra Post*, the above rumors are true then it must be made clear that these efforts of Americans to control three-quarters of the rubber production cannot be passively regarded because Dutch interests would suffer too much.

THE AGRICULTURAL AID BANK

A report from Weltevreden says that the Agricultural Aid Bank which, as is known, with the aid of the Government will help deserving concerns, has now been founded. The president is Mr. Sibinga Mulder, director of agriculture, vice-president of the Nederlandsche Handel-Maatschappij; directors: the Ned-Indische Handelsbank, the Escompto Maatschappij, Tideman en Van Kerchem, John Peet & Co. and Geo. Wehry & Co.

THE A. V. R. O. S.

At a recent meeting of the A. V. R. O. S. (East Coast of Sumatra Rubber Planters Association) the Chairman reported that the United Serdang Plantations, Limited, here represented by Harrisons & Crosfield, presented the A. V. R. O. S. with 100 hectares (hectare 2.54 acres) of their concession lands for the purpose of establishing experimental gardens by the experiment station. In spite of decreased income, the Association has reduced contributions from gilders 0.90 to gilders 0.70 per acre.

The Société Financière has notified the A. V. R. O. S. that all their estates but one, will cease to be members of this association. It appears that the total contribution of these estates amounts to 20,000 gilders and that this money is now needed for more urgent purposes. It is understood that certain English concerns are considering similar steps.

At the meeting, it was evident that there was a strong feeling of pessimism among the estates represented by the Association and many expect a drastic shake-out. It was, however, decided that everything possible should be done to keep the Association going.

NETHERLANDS INDIES NOTES

The rubber estates Sonowangi, Soemberdoeren and Poerbojo have been ordered to close down.

The Semeroe lands, directed by Lintner & Co., are waiting for developments and the firm of Wattoe & Co., is also considering the closing down of its estates.

Dr. Arens, author of "Handlerding voor de Rubberbereiding" (Handbook for the Preparation of Rubber), has left the service of the Malang Experiment Station with which he had been connected. He did much good work at the station and his departure is regretted by his colleagues and planters. His successor is Dr. Bally, director of the Central-Java Experiment Station.

Recent Patents Relating to Rubber

THE UNITED STATES

GRANTED JULY 19, 1921

NO. 1,384,759 Tire tread. E. G. Hulse, assignor to Kelly-Springfield Tire Co.—both of Cumberland, Md.

1,384,774 Demountable rim. C. W. Nachand and E. M. Rahm, Jeffersonville, Ind.

1,384,817 Tire-armor. J. M. Baker, Tarboro, N. C.

1,384,888 Leak detector. B. Carlisle, Santa Ana, Calif.

1,385,055 Dust cap for pneumatic tires. W. O. Vivarttas, Weehawken, N. J.

1,385,095 Inflatable rubber article. F. T. Roberts, Cleveland, O., assignor to Faramount Rubber Consolidated, Inc., Philadelphia, Pa. (Original application filed August 16, 1917, Serial No. 186,477. Divided and this application filed April 3, 1919. Serial No. 287,288.)

1,385,165 Tire package. E. H. Angier, Framingham, Mass.

1,385,252 Block tire. W. L. Kemper, Topeka, Kans.

1,385,287 Footboard weather-guard. J. R. Valentine and F. W. Alkire, Salt Lake City, Utah.

1,385,328 Footwear support. C. W. Loudenslager (now by judicial change of name C. W. Louden), Los Angeles, Calif.

1,385,346 Surgical wound-dam. W. H. Taylor, Guelph, Ont., Can.

REISSUES

15,154 Insect killing device. G. W. Gomber, Conyngham, assignor, by mesne assignments, to A. W. Drake Manufacturing Co., Hazelton—both in Pa. Original No. 1,161,654, dated November 23, 1915.

GRANTED JULY 26, 1921

1,385,383 Reinforcement for tire beads. M. A. Marquette, Springfield, assignor to The Fisk Rubber Co., Chicopee Falls—both in Mass. (Original application filed April 9, 1919, Serial No. 288,716. Divided and this application filed December 10, 1919. Serial No. 343,725.)

1,385,527 Hand warmer or grip for steering wheels. S. Duer, St. Paris, O.

1,385,581 Life preserver. G. H. Pallady, Redondo Beach, Calif.

1,385,591 Repairing device for bicycle tires. R. Stafiej, Detroit, Mich.

1,385,612 Emergency automobile tire. C. G. Gerlach, Spokane, Wash.

1,385,653 Inner tube construction. O. Zancan, New York, N. Y.

1,385,753 Tire armor and antiskid device. A. Remar, Maynard, O.

1,385,774 Bridge for inner tubes. G. W. Bulley, St. Joseph, Mich.

1,385,804 Spring tire. W. E. Stout, Seattle, Wash.

1,385,805 Tire repair material. J. J. Voorhees, Jersey City, N. J.

1,385,821 Metal line hose. H. W. Goodall, Alden, Pa.

1,385,890 Armor reliner for tires. S. A. Rouse and H. C. Stockel, Chicago, Ill.

1,385,901 Cushion heel. A. Bucolo, Washington, D. C.

1,385,920 Temporary or permanent support for solid tires. B. & S. H. Lee, Sankey, England.

1,385,926 Anti-skid tire. C. P. Salgee, Philadelphia, Pa.

1,385,972 Kite balloon. R. H. Upson, assignor to The Goodyear Tire & Rubber Co.—both of Akron, Ohio.

REISSUES

15,166 Demountable rim. F. H. Moyer, Cleveland, O., assignor to General Rim Co., New York, N. Y. Original No. 1,116,723, dated November 10, 1914.

Chemical Patents will be found on pages 29-36. Machinery Patents on pages 37-38.

GRANTED AUGUST 2, 1921

1,386,072 Bead cable for automobile tires. A. C. Pratt, Deep River, Conn.
1,386,074 Tire valve and gage. I. Pulverman, Warren, Pa.
1,386,204 Pneumattic tire. W. H. Richards, Knoxville, Tenn.
1,386,368 Demountable wheel rim. N. Schenk, St. Louis, Mo.
1,386,427 Printer's inking roller. G. Runge, Cleveland, O.

REISSUES

15,171 Vehicle wheel. G. Schadee, assignor, by mesne assignments, of two-thirds to E. G. Gallagher, and one-third to A. Schadee —all of New York, N. Y. Original No. 1,272,122, dated July 9, 1918.

GRANTED AUGUST 9, 1921

1,386,599 Pneumatic tire. J. H. Courvoisier, Joplin, Mo.
1,386,635 Dust-brush for pencils. E. C. Kubik, St. Louis, Mo.
1,386,777 Catamenial apron. M. S. George, St. Louis, Mo.
1,386,823 Hard rubber tip protector for players of wind instruments. H. W. Wetmore, San Jose, Calif.
1,386,886 Elastic truss. N. Maggio, Brooklyn, N. Y.
1,386,935 Garter. W. H. Johnson, Arlington, N. J.
1,386,936 Sanitary bandage. L. M. Kirwan, Houston, Tex.
1,386,988 Rubber collar for polishing and grinding wheels. G. O. Burlew, Newark, N. J.
1,387,058 Elastic garter. G. H. Luneburg, Chicago, Ill.
1,387,216 Violin chin-rest. S. J. Wallace, Logansport, Ind.
1,387,242 Pneumatic cushion tire. I. Crane, Westwood, Mass.
1,387,243 Rubber heel and insert. G. N. Damon, assignor to The Lorain Rubber Heel Co.—both of Lorain, O.

GRANTED AUGUST 16, 1921

1,387,691 Insole. H. A. Davenport, Brockton, Mass., assignor to United Shoe Machinery Corporation, Paterson, N. J.
1,387,728 Artificial hand. E. Kramer, Mishawaka, Ind.
1,387,772 Tire-carrier. E. E. Ellis and H. A. Thomas, Alhambra, Calif.
1,387,777 Resilient wheel. F. C. Henry, New York, N. Y.
1,387,976 Rubber heel. C. C. Goodman, Elyria, O.
1,387,988 Rubber heel. L. Kaplan, New York, N. Y.
1,387,991 Pressure gage and cut-off for pneumatic tires. E. G. Kunke and H. E. Thompson, Oklahoma, Okla.
1,388,000 Rim-guard for tires. R. W. Fritchard, Baltimore, Md.
1,388,007 Automatic tire-signal. W. A. Stephens, Oakland, Calif.

THE DOMINION OF CANADA

GRANTED JULY 5, 1921

212,378 Rim attachment. The Goodyear Tire & Rubber Co., assignee of J. B. Atkins—both of Akron, O., U. S. A.
212,382 Pneumatic tire protector. The Jon-Con Tire Protector Co., Dover, Del., assignee of L. I. Jones, Bowling Green, O.—both in U. S. A.

GRANTED JULY 12, 1921

212,422 Automobile tire. A. L. Meeks, Gadson, Ala., U. S. A.
212,423 Tire cover. W. P. Mitchell, South Hall, Que.
212,446 Spring tire. V. O. Woodruff, Bridgetown, N. J., U. S. A.
212,451 Vulcanizing pad. The Canadian Consolidated Rubber Co., Limited, Montreal, Que., assignee of F. A. Brown, Indianapolis, Ind., U. S. A.
212,493 Rim and tire. A. W. Kemp, Toronto, Ont.

GRANTED JULY 19, 1921

212,499 Tire rim. E. Acha, San Juan, Porto Rico.
212,512 Nipple. J. T. Cowie, Nanaimo, B. C.
212,518 Inner tube with deflation alarm. B. E. Eichendorff, San Francisco, Calif., U. S. A.
212,588 Semi-demountable rim. L. A. Fizzell and A. E. Peterman, assignee of a half interest—both of Toronto, Ont.
212,595 Rubber inking roller. F. Smith, Philadelphia, Pa., U. S. A.

GRANTED JULY 26, 1921

212,627 Golf-ball marking device. A. G. Hupfel, Reno, Nev., U. S. A.

GRANTED AUGUST 2, 1921

212,705 Pneumatic tire. D. L. Davis, Philadelphia, Pa., U. S. A.
212,724 Life preserving suit. C. M. Wheeler, Steilacoom, Wash., U. S. A.
212,735 Resilient tire. F. L. Rapson, Liverpool, Lancaster, England.
212,736 Resilient tire. F. L. Rapson, Liverpool, Lancaster, England.
212,739 Steering wheel. G. D. Rose, Manchester, Lancaster, England.

THE UNITED KINGDOM

PUBLISHED AUGUST 4, 1921

164,530 Attaching labels with gutta percha. J. G. Cannon, 38 Golden Lane, Barbican, London.
164,542 Rubber tiles, floor coverings, etc. A. Skipsey, 40 Warwick Road, Chorlton-cum-Hardy, Manchester.
164,555 Solid tire. F. Reddaway, 50 Lime street, and G. J. Rackham, 146 Upper Richmond Road, Putney—both in London.
164,562 Rubber-studded pneumatic tire. J. James, 35 Coleshill Terrace, and A. G. T. Brown, 4 Frederick street—both in Llanelly, Carmarthenshire.
164,563 Rubber clothes washer. G. Anderson and Leyland & Birmingham Rubber Co., Limited, 24 Duke street, Aldgate, London.
164,637 Rubber mud guard. A. Pearman, 2a Brookmill Road, Deptford, London.
164,641 Sponge rubber upholstery. W. Baines, 9 Fishergate Hill, Preston, and P. H. W. Claud, 9 Graham Road, Pendleton, Manchester.
164,661 Catapult with rubber elastic. E. Jacob, 105 Heslington Road, York.
164,690 Medicinal dropper. C. H. Billods, Rue Grande, Audincourt, Doubs, France. (Not yet accepted.)
164,699 Emergency Tire. R. O. Dutcher, P. O. Box 213, Morocco, Ind., U. S. A. (Not yet accepted.)
164,702 Cushion tire. C. Noel, 35 Rue Gravel, Levallois-Perret, Seine, France.
164,722 Tire valve. J. A. Sahuc, Castlenau-Montratler, Lot, France. (Not yet accepted.)
164,769 Rubber in stair treads. H. Frood, Sovereign Mills, Chapel-en-le-Frigh, Derbyshire.
164,770 Vulcanized rubber solutions. H. P. Stevens, 15 Borough High street, London.

PUBLISHED AUGUST 10, 1921

164,895 Universal joints. H. Jelley, 36 Wake Green Road, Moseley, Birmingham.
164,952 Sectional inner tube. W. H. Richards, Knoxville, Tenn., U. S. A.
164,954 Rubber insulated rail joints. T. Hardiman, 74 London Road, and T. J. Wheeler, 32 Park Fields—both in Chippenham, Wiltshire.
164,983 Revolving rubber heel. T. E. Quickenden, 24 Cavendish Road, Harringay, London.
165,010 Rubber used in creasing trousers. W. W. Balding, 8 Duchess street, London.
165,087 Side-wall tire valve. Michelin et Cie, Clermont Ferrand, France. (Not yet accepted.)
165,090 Tire valve dust cap. A. Schrader's Son, Inc., 470 Vanderbilt avenue, Brooklyn, assignee of M. C. Schweinert, 42 Riverside Drive, New York—both in New York, U. S. A. (Not yet accepted.)

PUBLISHED AUGUST 17, 1921

165,104 Cementing rubber soles. Atlas-Werke Pohler & Co., 64 Schönbachstrasse, Leipzig, Germany. (Not yet accepted.)
165,128 Wire reinforced tire. S. C. Caddy, 205 Richmond Road, Kingston-on-Thames.
165,136 Block tire. A. V. Roe, High Firs, Bursledon, Hampshire.
165,173 Automobile steering wheel of fiber and rubber. Coir Tyre Co., Limited, and G. D. Rose, 56a Mosley street, Manchester.
165,195 Rubber crystallizing pan. F. Peters, 25 Aylesbury Road, Portsmouth.
165,206 Rubber roller non-skid device. W. J. Sherrington, Ivy Cottage, Waldringfield, Woodbridge, Suffolk.
165,287 Gagging-appliance. W. R. Wilson, Inchavore, Thorne Road, Doncaster.
165,325 Gutta percha, water-proofed fuse cord. W. Friedrich, 14 Kirchstrasse, Troisdorf, near Cologne, Germany.
165,344 Elastic garters. G. A. Frost, 170 Chestnut street, West Newton, and George Frost Co., 551 Tremont street, Boston—both in Mass., U. S. A.
165,348 Combined sponge and soap holder. J. L. Wentz, 127 Aycrigg avenue, Passaic, N. J., U. S. A.
165,366 Rubber band pen or pencil holder. W. H. Brecknell, 28 Meadow street, Weston-super-Mare.

PUBLISHED AUGUST 24, 1921

165,442 Pneumatic tire covers are formed in two sections. R. R. Vale, Milford, Del., U. S. A. (Not yet accepted.)
165,477 Rubber in stair treads. H. Frood, Sovereign Mills, Chapel-en-le-Frith, Derbyshire.
165,531 Mud guard. T. W. and E. Hallam—both of 29 Slade Lane, Longsight, Manchester.
165,538 Sole and heel protector. R. S. Brown, 39 Victoria street, Westminster.
165,592 Rubber covered balls. W. Roberts, 24 Union street, Inverness.
165,618 Mud guard. E. J. Blackford, 187 Lodge Road, Birmingham.

NEW ZEALAND

PUBLISHED JULY 28, 1921

45,635 Pneumatic tire inner tube. W. K. Hughes, 22 Collins street, and S. G. Pirani, 331 Collins street, both of Melbourne, assignees of E. W. Thurlow, 26 New street, Brighton—both in Victoria.

GERMANY

PATENTS ISSUED WITH DATES OF ISSUE

341,452 (May 5, 1916) Resilient tire with rim as air pressure chamber. Ladislaus v. Bano and Arpad v. Galocsy, Budapest, Hungary; represented by Dr. B. Alexander-Katz, Berlin, S.W. 48.
341,473 (December 3, 1920) Rubber sound box for talking machines. Fred Adams, Philadelphia, Pennsylvania, U. S. A.; represented by F. Meffert and Dr. Sell, Berlin, S.W. 68.

TRADE MARKS

THE UNITED STATES

TWO KINDS OF TRADE MARKS NOW BEING REGISTERED

Under the rules of the United States Patent Office, trade marks registered under the Act of February 20, 1905, are, in general, fanciful and arbitrary marks, while those registered under the Act of March 19, 1920, Section 1 (b), are non-technical, that is, marks consisting of descriptive or geographical matter or mere surnames. To be registered under the latter act, trade marks must have been used for not less than one year. Marks registered under this act are being published for the first time when registered, any opposition taking the form of an application for cancellation.

GRANTED JULY 19, 1921, ACT OF FEBRUARY 20, 1905

NO. 144,727 COLLINS' RAPPID-SEALER and portrait of registrant within representation of a tire—tire repair composition. G. W. Collins, Wilmington, Del.
144,740 Conventionalized shield in red bearing the monogram DMTCO—tires. The Denman-Myers Cord Tire Co., Cleveland, Ohio.
144,781 SENTRY—hose made of rubber reinforced with fabric. The B. F. Goodrich Co., New York, N. Y.
144,782 DIAMOND—tires, tubes, patches, sleeves and reliners. The B. F. Goodrich Co., New York, N. Y.

144,797 'ORDER FROM HORDER'—rubber stamps. Horder's, Incorporated, Chicago, Ill.
144,859 ANGLE TREAD—tires, casings, and tubes. The Marathon Tire & Rubber Co., Cuyahoga Falls, Ohio.
144,879 RENOWN—tires and tubes. The National Tire & Rubber Co., East Palestine, Ohio.
144,913 ARCH GUIDE—Boots and shoes of leather, rubber, etc. Thomas G. Platt Co., Boston, Mass.
144,958 The words RAYNGARD and WEATHER PROOF within an oval outline—waterproof and weatherproof coats. United States Rubber Co., New Brunswick, N. J., and New York, N. Y.
144,973 SANAS—Waterproof garments for small children. A. M. M. White, Elmhurst, N. Y.

ACT OF MARCH 19, 1920, SECTION 1 (b)

144,989 Representation of the word CORD formed by a cord so drawn as to form the word—rubber boots and shoes. Bourn Rubber Co., Providence, R. I.
144,993 Representation of a pneumatic tire, enclosing a tire section, within which are the words DOSS TIRES—rubber tires. The Doss Rubber & Tube Co., Inc., Atlanta, Ga.
144,994 Representation of a pneumatic tire, enclosing a tire section—rubber tires. The Doss Rubber & Tube Co., Inc., Atlanta, Ga.
144,999 THE HALL MARK OF QUALITY, with a diamond center enclosing the words HALL and TOPEKA. The whole design is surrounded by a single line, forming a rectangle—rubber bands. The Hall Lithographing Co., Topeka, Kans.
145,007 SERVICE—outer tubes or shoes for pneumatic tires. Service Auto Equipment Corporation, Kansas City, Mo.
145,018 CHAIN TREAD—rubber vehicle tires. United States Tire Co., New York, N. Y.
145,021 LO-TEST—rubber gloves. The Wilson Rubber Co., Canton, O.
145,022 PURITEX—rubber gloves. The Wilson Rubber Co., Canton, O.
145,023 HI-TEST—rubber gloves. The Wilson Rubber Co., Canton, O.

GRANTED JULY 26, 1921, ACT OF FEBRUARY 20, 1905

145,046 BULL DOG—tires, tubes and casings. Braender Rubber & Tire Co., Rutherford, N. J.
145,050 Representation of a man's figure in outline, across which are the words SAVE A DOLLAR EVERYMAN. The whole device is surrounded by a circle—shoes of rubber fabric, leather, and combinations. Brown Shoe Co., Inc., St. Louis, Mo.
145,084 WEDCO within a diamond outline—tire fabrics, ducks, drills, osnaburgs, etc. W. W. Edelstone, Cambridge, Mass.
145,102 GOODRICH—rubber bands. The B. F. Goodrich Co., New York, N. Y.
145,109 STRONGHEART—tires. The Hartford Rubber Works Co., Hartford, Conn.
145,124 RED CIRCLE on representation of tire enclosing the words OUR DADDY'S CHOICE, and the heads and shoulders of a girl and boy—sheet rubber patches. The Jones & Jones Co., Kingman, Kans.
145,125 JUSTA—each letter of this word in black against a sunburst—tire patches. Justa Manufacturing Co., Oklahoma City, Okla.
145,167 OMO with a pair of wings springing from top points of the letter M—elastic webbing, cord, braid and dress belting. The Omo Manufacturing Co., Middletown, Conn.
145,180 MULTI-MILE—tires and tubes. Racine Rubber Co., Racine, Wisc.
145,181 RACINE COUNTRY ROAD—tires and tubes. Racine Rubber Co., Racine, Wisc.
145,186 GRANITE—tires. Revere Rubber Co., Providence, R. I.
145,200 SEALTYTE LEAK-PROOF TUBES—pneumatic tires. Victory Rubber Manufacturing Co., Atlanta, Ga.

ACT OF MARCH 19, 1920, 1 (b)

145,285 PEERLESS in black letters, within an ellipse-shaped design—typewriter keys, twirlers and shock absorbers. Peerless Key Co., Inc., New York, N. Y.
145,294 Two concentrated circles, the inner being section lined, across which is the word FLOATER and the figure 27. The word follows the form of the circle—golf balls. United States Rubber Co., New York, N. Y.

GRANTED AUGUST 2, 1921, ACT OF FEBRUARY 20, 1905

145,311 MASCOT TUBES over representation of a ram's head above a panel bearing the quoted words "TOO TOUGH FOR ME"—inner tubes. American Wholesale Corporation, Baltimore and Cumberland, Md.
145,337 CLECKTA—leather and balata belting. Henry F. Cockill & Sons, Limited, Whitcliffe, Cleckheaton, England.
145,355 INSO—rubber coated fabric inner tubes for relining pneumatic tire casings. George W. Eno Rubber Co., Los Angeles, Calif.
145,356 EXCO—retreads for attachment to the outer surfaces of worn pneumatic tire casings. George W. Eno Rubber Co., Los Angeles, Calif.
145,405 Representation of a pair of hands adjusting sections of tire rim on a tire—solid resilient inner tubing. J. T. McMahon, Kansas City, Mo.
145,431 ANGELUS TIRE COVER superimposed above representation of a tire against a triangular background—fabric tire covers. Parker & Waterman Manufacturing Co., Los Angeles, Calif.
145,459 STAMINA OF THE SIOUX—inner tubes and fabric and cord tires. Sioux City Tire & Manufacturing Co., Sioux City, Ia.
145,492 THREE POINT—golf balls. The Worthington Ball Co., Elyria, Ohio.

ACT OF MARCH 19, 1920, 1 (b)

145,505 LONGLIFE—belts and belting made of rubber combined with fabric. The B. F. Goodrich Co., New York, N. Y.
145,508 A black circular design within which is the word INDIA in white letters, so formed as to fill the circle—pneumatic tire casings and inner tubes composed of rubber, rubber composition, or fabric and rubber. The India Tire & Rubber Co., Mogadore, O.
145,516 MOLESKIN—waterproof upholatering fabrics. O'Bannon Corporation, New York, N. Y.
145,525 STUDEBAKER—tires. The Studebaker Corporation, South Bend, Ind., and Detroit, Mich.
145,528 NONPAREIL—tires. United States Tire Co., New York, N. Y.

GRANTED AUGUST 9, 1921, ACT OF FEBRUARY 20, 1905

145,571 ARCH DEVELOPER—boots, shoes, and slippers of leather, rubber, etc. Thomas G. Plant Co., Boston, Mass.
145,572 ARCH COMBINATION—boots, shoes and slippers of leather, rubber, etc. Thomas G. Plant Co., Boston, Mass.
145,574 The words CINCY COMFORTS, the letter C forming the first letter of both words—shoes made of leather, rubber, etc. The Queen City Turn Shoe Co., Cincinnati, O.

GRANTED AUGUST 16, 1921, ACT OF FEBRUARY 20, 1905

145,642 Representation of a tire having black tread separated from gray or white sidewalls by narrow red band or bands—tires. The Dayton Rubber Manufacturing Co., Dayton, O.
145,720 ALL IN ONE—heel cushions. L. G. & S. S. Co., Boston, Mass.
145,721 STEPSOFT—heel cushions. L. G. & S. S. Co., Boston, Mass.
145,722 WARMTREAD—insoles. L. G. & S. S. Co., Boston, Mass.
145,723 WOKSOFT—cushion insoles. L. G. & S. S. Co., Boston, Mass.
145,724 FOOT SAVE—arch and heel cushions. L. G. & S. S. Co., Boston, Mass.
145,726 "BEST-ON"—heel lining repairers. L. G. & S. S. Co., Boston, Mass.
145,761 N within a black circle—fabric fire hose. Chas. Niedner's Sons Co., Malden, Mass.
145,774 PENNINGTON with shield bearing the letter F—boots and shoes of leather or leather and rubber in combination. Pennington-Crowell Shoe Co., Manchester, N. H.
145,781 ARCH FORM—boots, shoes and slippers of leather, rubber, etc. Thomas G. Plant Co., Boston, Mass.
145,788 RACINE MULTI-MILE CORD—tires. Racine Rubber Co., Racine, Wisc.
145,795 REVERE—tires. Revere Rubber Co., Providence, R. I.
145,819 TIGER-FOOT—tires. The Standard Tire Co., Willoughby, O.
145,820 DANDY LINE and representation of a dandelion—pneumatic tires and inner tubes. Standard Four Tire Co., Keokuk, Ia.
145,821 GOLDEN ROD and representation of a spray of golden rod—tires and tubes. Standard Four Tire Co., Keokuk, Ia.
145,841 GOPHER and representation of a gopher—shoes of leather, rubber, etc. N. P. Turnbladh, Duluth, Minn.
145,864 LONG LIFE within a double-outlined diamond—rubber and canvas hose. The Whitehead Bros. Rubber Co., Trenton, N. J.

ACT OF MARCH 19, 1920, 1 (b)

145,894 MILLER—toy balloons and sponge rubber balls. The Miller Rubber Co., Akron, O.

THE DOMINION OF CANADA

REGISTERED

28,459 Picture of a tire with a gloved hand extending therethrough holding a scalpel—rubber goods, namely, medicine droppers, sanitary aprons, diapers, baby pants, baby bibs, nursery sheeting, nipples, nursing bottles, surgeons' gloves, finger cots, rectal tubes, colon tubes, stomach tubes, catheters, hard rubber syringe pipes and fittings, hard rubber screw connections, ice caps, ear and ulcer syringes, vaginal douches, infant syringes, breast pumps, invalid cushions, water bottles, fountain syringes, combination syringes. The Miller Rubber Co., Akron, O., U. S. A.
28,460 Picture of a tire with a gloved hand extending therethrough holding a scalpel—rubber sponges, bathing caps, toy balloons, sponge rubber, fountain pen reservoirs (collapsible), household gloves, acid gloves, linemen's gloves, rubber tubing, pneumatic tires, inner tubes, air bags, inner tube patches, tire dough, cement, tire patching material, tire repair kits, tire repair boots, tire patches, tire reliners, tire retread bands, tire recovers, tire blow-out patches, tire repairing fabric (prepared), tire repairing gum (calendered), camel back gum (for treads), tire flaps. The Miller Rubber Co., Akron, O., U. S. A.
28,492 HOOD with an arrow therethrough—tires, tubes and their accessories. Hood Rubber Co., Watertown, Mass., U. S. A.
28,704 BERGOUGNAN—automobile tires. Bergougnan Rubber Corporation, Trenton, N. J., U. S. A.
28,751 FISK—articles composed wholly or in part of rubber, such as rubber tires, both pneumatic and solid, rubber tubes, particularly inner tubes for pneumatic tire casings, accessories for rubber tires, such as flaps, reliners and rim filler strips, and tire repair supplies, such as rubber stock, rubber coated fabric, patches and patch material, cement, tire dough, sectional air bags, and bead pressure pads. The Fisk Rubber Co., Chicopee Falls, Mass., U. S. A.
28,781 Representation of a flying machine—accelerators for vulcanizing purposes. National Aniline & Chemical Co., Inc., New York, N. Y., U. S. A.
28,782 NATIONAL DYES and the letters U. S. A. within an ellipse—accelerators for vulcanizing purposes. National Aniline & Chemical Co., Inc., New York, N. Y., U. S. A.

THE UNITED KINGDOM

PUBLISHED AUGUST 3, 1921

404,864 Representation of two X-shaped figures joined to form a square at the center. Across this device, and with the letter X in the center of the square, are the letters D X N. No claim is made to the exclusive use of the letters "D. X. N." or the word "Dixon"—Pencils and erasers included in Class No. 39. Joseph Dixon Crucible Co., Wayne & Monmouth streets, Jersey City, N. J., U. S. A. Address for service in the United Kingdom, care of A. M. & W. Clark, 53-54 Chancery Lane, London, W. C. 2.
413,317 Representation of two ducks swimming, while water is being poured upon them from a sprinkling-can. The whole device is enclosed in a two-line rectangular frame—rainproof and waterproof coats and trousers. The Express Manufacturing Co. (Manchester), Limited, 431-435 Rochdale Road, Manchester.
415,670 GEM—dress shields included in Class No. 40. I. B. Kleinert Rubber Co., 721-727 Broadway, New York, N. Y., U. S. A., and 87 Queen Victoria street, London, E. C. 4.

415,867 PRESIDENT—india rubber plates or pads for attachment to the soles of hoots and shoes. Phillips' Patents, Limited, 142-6 Old street, London, E. C. 1.

PUBLISHED AUGUST 10, 1921

B410,299 RAINGUARD—waterproof and rainproof garments. Levy & Weisgard, New Ideal Factory, Derby street, Cheetham, Manchester.

411,325 Representation of a tag, upon which are the letters T A G—thermometers, gages, temperature controllers, hydrometers, viscosimeters, flash testers, fire testers, oil freezers, hygrometers, pyrometers, centrifuges and stills for laboratory use, all being goods included in Class No. 8. C. J. Tagliabue Manufacturing Co., 18-88 Thirty-third street, Brooklyn, N. Y., U. S. A. Address for service in the United Kingdom, care of White, Langner, Stevens & Parry, Jessel Chambers, 88-90 Chancery Lane, London, W. C. 2.

B412,018 UNIVERSAL—dough-making, kneading and mixing machines. J. Baker, Sons & Perkins, Limited, Westwood Works, Peterborough.

413,756 DIXIT—all goods included in Class No. 40. R. & J. Dick, Limited, 3 McPhail street, Greenhead, Glasgow, Scotland.

414,747 Representation of three coherent prisms, the design in black covered with small white circles, the whole surrounded by the initials K R A. No claim is made to the exclusive use of the letters "K R A."—goods manufactured from india rubber and gutta percha not included in other classes. Köln-Rottweil Aktiengesellschaft, 8 Hindersinstrasse, Berlin, N. W. 40, Germany. Address for service in the United Kingdom, care of Haseltine, Lake & Co., 28 Southampton Buildings, London, W. C. 2.

415,435 RICKITE—covering, insulating, and like material, manufactured from india rubber or in which india rubber predominates. E. Rickard, 7 Parkinsons Chambers, Hustlergate, Bradford, Yorkshire.

PUBLISHED AUGUST 17, 1921

414,724 GOSSAMAC—macintoshes, being articles of clothing. J. Weinberg & Sons, Aquarock Mills, North street, Cheetham, Manchester.

415,669 GEM—baby pants, being articles of clothing. I. B. Kleinert rubber Co., 721-727 Broadway, New York, N. Y., U. S. A., and 87 Queen Victoria street, London, E. C. 4.

415,672 JEWEL—baby pants, being articles of clothing. I. B. Kleinert Rubber Co., 721-727 Broadway, New York, N. Y., U. S. A., and 87 Queen Victoria street, London, E. C. 4.

416,209 CENTURION—india rubber tires. The Enfield Cycle Co., Limited, Enfield Works, Hewell Road, Redditch.

416,496 HUMATO BRAND—goods manufactured from india rubber and gutta percha, not included in other classes. W. Menzies & Co., 165 Fenchurch street, London, E. C. 3.

PUBLISHED AUGUST 24, 1921

411,077 The word BAYSIDE on a white background surrounded by a heavily-shaded border, of elliptical shape, narrowing toward the center—rubber boots and shoes, rubber overshoes and rubber sole canvas shoes. Hood Rubber Co., 99 Bedford street, Boston, Mass., U. S. A. Address for service in the United Kingdom, care of Marks & Clerk, 57-8 Lincoln's Inn Fields, London, W. C. 2.

411,078 The word LAKESIDE in black letters on a white ground and surrounded by a three-lined rectangle, having a flap-like projection at each end—rubber boots and shoes, rubber overshoes and rubber canvas shoes. Hood Rubber Co., 99 Bedford street, Boston, Mass., U. S. A. Address for service in the United Kingdom, care of Marks & Clerk, 57-8 Lincoln's Inn Fields, London, W. C. 2.

413,329 KALEANER—impregnated electrical insulation tape not included in other classes. Callender's Cable & Construction Co., Limited, Hamilton House, Victoria Embankment, London, E. C. 4.

415,001 MALLATYPE—india rubber erasers and fountain pens. E. J. Reveliere, trading as Etablissements Mallat, 80 Finsbury Pavement, London, E. C. 2, and 53 Boulevard de Strasbourg, Paris, France.

415,432 KALEANER—adhesive tape, not medicated, for surgical purposes. Callender's Cable & Construction Co., Limited, Hamilton House, Victoria Embankment, London, E. C. 4.

415,618 A shaded cross, over which is tied a key. The applicants undertake not to use the cross device in red or in white on a red ground—india rubber caps or covers for the keys of manually operated machines such as typewriters or adders. Munson Supply Co., Limited, Regent House, Kingsway, London, W. C. 2.

DESIGNS

THE UNITED STATES

NO. 58,541 Pneumatic tire. Patented August 2, 1921. Term 14 years. F. A. Bollinger, Akron, assignor to The Oldfield Tire Co., Cleveland—both in O.

58,547 Solid rubber tire. Patented August 2, 1921. Term 7 years. L. E. Clough, Akron, assignor to The Mason Tire & Rubber Co., Kent—both in O.

58,574 Doll. Patented August 2, 1921. Term 14 years. F. Kaupmann, Jr., Brooklyn, N. Y., assignor to The Faultless Rubber Co., Ashland, O.

58,575 Doll. Patented August 2, 1921. Term 14 years. F. Kaupmann, Jr., Brooklyn, N. Y., assignor to The Faultless Rubber Co., Ashland, O.

58,602 Tire tread. Patented August 2, 1921. Term 14 years. H. W. Kugler, Princeton, N. J., assignor to Globe Rubber Tire Manufacturng Co., New York, N. Y.

58,610 Non skid tire. Fatented August 2, 1921. Term 14 years. H. McCreary, Indiana, Pa.

58,612 Automobile tire. Patented August 2, 1921. Term 7 years. B. L. Mellinger, Kansas City, Mo.

58,629 Automobile tire tread. Patented August 2, 1921. Term 14 years. J. R. Riley, Dunbar, assignor to Dunbar Tire & Rubber Co., Charleston—both in W. Va.

58,640 Pneumatic tire tread. Patented August 2, 1921. Term 14 years. F. R. Talbott, assignor to The Victor Rubber Co.—both of Springfield, O.

58,674 Tire tread. Patented August 9, 1921. Term 14 years. W. G. Lerch, Akron, assignor to India Tire & Rubber Co., Mogadore—both in O.

58,683 Tire tread. Patented August 9, 1921. Term 14 years. J. W. Price, assignor to the Delion Tire & Rubber Co.—both of Baltimore, Md.

THE DOMINION OF CANADA

5,115 Tire tread. Patented July 19, 1921. F. Hill, Hamilton, Ont.
5,116 Tire tread. Patented July 19, 1921. H. Obee, Toronto, Ont.
5,117 Tire tread. Patented July 19, 1921. Hercules Rubber Co., Limited, Brampton, Ont.

5,131 Rubber cap for floor brushes. Patented July 21, 1921. The Boeckh Co., Limited, Toronto, Ont.

GERMANY

DESIGN PATENTS ISSUED WITH DATES OF ISSUE

784,708 (December 18, 1920) Corn plaster. "Vulnoplast" Fabrik Bonner Kautschukpflaster und Chemisch-pharmazeutischer Präparate E. Lakemeier, Bonn-on-the-Rhine.

784,717 (April 18, 1921) Pessary. Walter Pouet, Pankstrasse 59, Berlin.

784,808 (June 16, 1921) Disposition of valves for inner tubes. L. Waldthausen, Wesel.

785,026 (June 9, 1921) Irrigator. Alexander Küchler & Söhne, Ilmenau.

785,030 (June 13, 1921) Material for students' caps treated with rubber solution. Peter Küpper, Ronsdorf.

785,080 (May 26, 1921) Rubber heel. Continentale Isola Werke Akt.—Ges. Birkesdorf b. Düren, Rhld.

785,083 (May 28, 1921) Sanitary band. Emil Wieschebrink, Königstrasse 19, Rheydt.

785,237 (January 8, 1921) Atomizer. Joseph Lenzi, Johannes Haagstrasse 2, Augsburg.

785,392 (December 3, 1920) Rupture band. Ludwig Müller, Zentgrafenstrasse 110, Kassel K.

785,411 (June 8, 1921) Inhaling apparatus. Alfred Löbl, Vienna; represented by M. Gugel, Munich.

785,421 (June 21, 1921) Atomizer with revolving cap. Max Köhler, Reichenberger Strasse 40-41, Berlin.

785,512 (June 27, 1921) Rubber disk for dental plate. Karl Bühler, Oberndorf, a. N.

785,564 (May 30, 1921) Rubber for sticks, crutches and the like. August Hugenbruch, Celle.

785,582 (June 16, 1921) Hollow rubber article composed of two parts. Fred Thomas Roberts, Cleveland, Ohio; represented by A. Elliot, Berlin, S. W. 48.

785,663 (May 12, 1921) Sponge rubber insole. Akt.-Ges. Metzeler & Co., Münich.

785,866 (June 25, 1921) Rubber heel patch. Max Götze, Steuerwalderstrasse 20, Hildesheim.

785,919 (December 29, 1920) Rupture band. Heinrich Loewy, Dorotheenstrasse 77-78, Berlin.

786,082 (July 2, 1921) Rupture band. Friedrich Eherins, Rosslau.

786,132 (May 28, 1921) Rubber coat and cape with watertight seams without gummed strips. Max Kupfer, Schmidstrasse 4, Berlin.

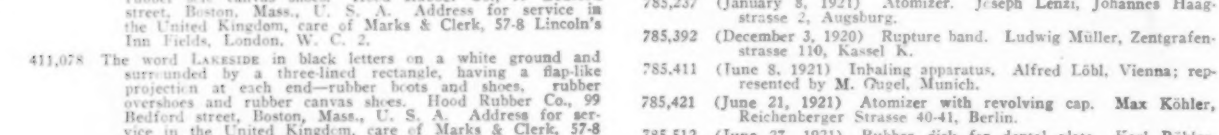
786,301 (June 17, 1921) Rubber heel. August Ullrich, Kaiser-Wilhelmstrasse 55, Mannheim-Neckarau.

786,363 (June 6, 1921) Ribbed rubber insole. Westdeutsche Gummi Comp. H. Chermann, Düsseldorf.

786,380 (June 27, 1921) Rubber sole, sewed and gummed. Richard Zeiger, Grossanheim near Hanau.

786,477 (June 9, 1921) Leader for extensible pessary. Fritz Schulz, Hohenzollernstrasse 60, Gelsenkirchen.

786,478 (June 9, 1921) Extensible pessary. Fritz Schulz, Hohenzollernstrasse 60, Gelsenkirchen.



58,547 58,602 58,612 58,610 58,683 58,541 58,629 58,674 58,640

United States Commerce in Crude Rubber and Rubber Manufactures

Fiscal Year 1913-14 Compared With Calendar Year 1920.

What strikes the person comparing figures for the calendar year 1920, with those of a pre-war year—say the fiscal year June, 1913—June, 1914, which brings us right up to within a month of the outbreak of the war—is not in the first place the greatly increased trade, the low prices or the new sources of supply, but the shifting in the positions occupied by the various countries, either as producers and suppliers of the raw article, as middlemen, or as importers of manufactured goods. And it need hardly be said that the war was chiefly responsible for this.

CRUDE RUBBER IMPORTS

Taking first the imports of crude rubber, we have a total of 566,546,136 pounds, value $242,795,773, for the calendar year 1920, as compared with 131,995,742 pounds, value $71,219,851 in the fiscal year ended June 30, 1914.

In 1920 the greater part of the rubber came direct from Asia, when the Straits Settlements alone sent 296,448,104 pounds, value $133,168,879, out of a total of 429,021,505 pounds, value $188,539,237. Next comes the Dutch East Indies with 72,374,169 pounds, value $31,147,774; other British East Indies (including Ceylon) followed with 51,940,226 pounds, value $20,588,941; British India supplied 3,536,109 pounds, value $1,572,017; Japan accounted for 3,392,943 pounds, value $1,418,237; Hongkong for 728,267 pounds, value $308,610; from China came 530,237 pounds, value $312,230; from Siam 68,450 pounds, value $19,540; last came French East Indies with 3,000 pounds, value $3,000.

Quite different are the figures for the period 1913-1914. Then only 16,597,105 pounds, value $9,675,709, came direct from Asia and of this Straits Settlements, chief Asiatic supplier at that time, too, sent 9,035,503 pounds, value $5,122,318; other British East Indies (including Ceylon), third on the 1920 list, came second with 7,091,146 pounds, value $4,263,594; the Dutch East Indies, which by 1920 outstripped Ceylon as a source of rubber, then ranked a poor third with 463,220 pounds, value $286,437. India came last with 7,236 pounds, value $3,300. Japan, Hongkong, China, French East Indies, Siam did not appear on the list.

With regard to South America, it is only when the figures for 1920 and 1913-1914 are conisdered in connection with other countries that the shifting in the rubber industry becomes clear. For the quantities have remained practically stationary, the grand totals being 43,197,130 pounds, value $12,487,852 against 42,486,727, value $17,125,936, in 1913-1914. The drop in the price of rubber is here quite evident.

Brazil was the chief exporter as usual and sent 36,981,973 pounds, value $10,533,541 in 1920 as compared with 40,641,305 pounds, value $16,319,048. Peru was second with 4,097,701 pounds, value $1,284,589, against 1,016,566 pounds, value $427,002 in the pre-war year; Colombia third with 766,720 pounds, value $245,887 instead of 382,205 pounds, value $175,870; then Ecuador with 628,569 pounds, value $154,017, against 214,583 pounds, value $75,941. From Venezuela came 373,830 pounds, value $124,924 in 1920 and 232,051 pounds, value $128,063 during 1913-14. Dutch Guiana, which just before the war accounted for only 17 pounds, value $12, in 1920, is credited with 12,048 pounds, value $8,189. During the latter year Uruguay supplied 216,305 pounds, value $83,575; British Guiana 16,551 pounds, value $11,815; and Argentina 3,010 pounds, value $1,241, while in 1913-14 these countries were not mentioned.

Very little change, too, is found in the imports from North America, for in 1913-14 these were 1,365,803 pounds, value $749,112, and in 1920, 1,575,984 pounds, value $719,178. During 1913-14, Mexico contributed 641,029 pounds, against 900,411 pounds in 1920; from Nicaragua came 307,427 pounds, against 130,643 pounds; from Panama 110,561 pounds, against 36,166 pounds; from the other Central American States 166,876 pounds, instead of 33,774 pounds. Last year Cuba also sent 44,008 pounds, and the West Indies 59,648 pounds.

During the period 1913-14 no direct imports from Africa were noted, while during 1920 these amounted to 368,644 pounds, value $138,650. The greater part came from the British possessions and amounted to 264,164 pounds, value $114,611; from Belgian Congo came 103,518 pounds, value $23,809; from Portuguese Africa 962 pounds, value $230.

When 1920 imports from Europe and Canada are compared with those for the same countries in 1913-14, it becomes evident that during the intervening years, direct dealing with the actual sources of production has developed considerably and that imports from countries acting as middlemen have shrunk proportionately.

Thus, while Europe's share in 1913-14 exports to this country amounted to 71,543,861 pounds, value $43,667,571 out of a total of 131,995,742 pounds value $71,219,851, in 1920 the figures were 92,136,832 pounds, value $40,822,494 out of a total of 566,546,136 pounds, value $242,795,773. England headed the lists on both occasions with 48,279,629 pounds, value $31,152,311 in 1913-14 and 75,297,018 pounds, value $34,405,278 in 1920; Belgium's prewar exports of 11,005,246 pounds, value $6,481,901, fell to 1,437,642 pounds, value $486,430. Germany, which sent 7,052,767 pounds, value $3,595,369 in 1913-14, of course did not figure on the 1920 list at all.

French exports increased in 1913-14 from 2,629,287 pounds, value $1,124,629, to 3,588,662 pounds, value $1,117,089, in 1920; and those from the Netherlands from 2,016,440 pounds, value $1,134,060, to 8,859,178 pounds, value $3,898,785, in 1920. In the face of the considerable growth of the total United States imports these increases of course mean very little.

IMPORTS BY CUSTOMS DISTRICTS

Although the figures given under this head show the distribution of rubber according to the official and not the actual ports of entry, nevertheless, it is possible to draw some interesting conclusions with regard to the shipping of rubber. In 1920 New York received 501,590,726 pounds, value $212,755,278; San Francisco, 21,839,779 pounds, value $9,445,932; Washington (Seattle and Tacoma) 14,217,769 pounds, value $6,590,443; in 1919 New York's share was 368,146,386 pounds, value $150,168,723; that of San Francisco 60,209,143 pounds, value $23,787,035; and of Washington, 64,556,132 pounds, value $26,027,058; for 1918 the figures for these three districts were 119,664,398 pounds, 53,063,123 pounds and 109,557,617 pounds; and during 1917-18 New York received 171,643,218 pounds and San Francisco 80,907,215 pounds.

In comparing the figures of the two war years with those of the two years after the war, it will be noted that, whereas, San Francisco received almost half as much as New York in 1917-18 and in the calendar year 1918, and during the latter period the combined receipts of the Western districts San Francisco and Washington (Seattle and Tacoma) were actually half as much again as those received at New York, the proportions underwent a great change after the armistice was declared. For in 1919 the combined shipments in the two western districts men-

tioned were only one-third of those listed for New York, and in 1920 the difference was still greater when the ratio was about 1 to 14. Obviously, therefore, when with peace returned the safety of the Atlantic ocean, necessity no longer required that shipments be made to western ports.

Ohio for different reasons also showed a decrease, the 1920 total being 12,505,669 pounds; Massachusetts fell to 2,090,163 pounds; Dakota to 2,651,241 pounds; Michigan to 56,205 pounds; St. Lawrence to 37,079 pounds, and Buffalo to 5,845 pounds. Colorado increased from 133,165 pounds in 1919 to 1,210,599; San Antonio rose to 527,923 and New Orleans to 521,425 pounds. Oregon with 3,867,400 pounds, Los Angeles with 3,299,290 pounds, Philadelphia with 894,961 pounds, San Diego with 769,948 pounds, Maryland with 234,359 pounds, and Maine and New Hampshire with 225,735 pounds were added to the list, while Vermont, Southern California, and Arizona dropped out.

CRUDE RUBBER EXPORTS

The amount of crude rubber exported from the United States during 1920 was 9,317,308 pounds, value $2,846,898. Of this, Canada took 5,407,948 pounds, England 1,758,921 pounds, Germany 582,734 pounds, Italy 510,720 pounds, Australia 235,800 pounds, Cuba 149,263 pounds and the Straits Settlements 134,798 pounds. In 1913-14 the totals were 3,747,749 pounds, value $2,398,150, of which 3,179,489 pounds went to Canada, 201,757 pounds to Germany, 131,016 pounds to France and 141,229 pounds to England.

GUTTA PERCHA

United States imports of crude gutta percha during 1920 amounted to 7,129,127 pounds, value $1,520,309. Of this the Straits Settlements supplied 5,093,346 pounds and the Dutch East Indies 1,852,110 pounds. From Brazil came 37,831 pounds, from British Africa 19,396 pounds, and from England 124,098 pounds. In 1913-14 the totals were 1,846,109 pounds, value $323,567. At that time, too, the Straits Settlements supplied the bulk—1,550,131 pounds; the Dutch East Indies sent 33,965 pounds and 7,806 pounds came from North America. In that year Germany, now off the list, exported to us 174,227 pounds, England 63,208 pounds and France 16,276 pounds. Again it will be seen that the percentage of gutta percha shipped direct has increased considerably since the period 1913-14. The shifting in the amounts received at the customs districts noted in the case of rubber, is also evident as far as gutta percha is concerned, for while during the last war year, 1918, only 470,478 pounds out of a total of 1,207,986 pounds arrived at New York, 501,760 pounds entering at New Orleans and the remainder at the western ports, practically the whole amount, 6,910,336 pounds, came in at New York in 1920. Massachusetts received 122,188 pounds, and Philadelphia 96,439 pounds. None of the western districts is listed except Los Angeles which, however, is credited with only 164 pounds.

GUAYULE

All of the 1920 imports of guayule came from Mexico and entered at San Antonio. The totals were 1,698,859 pounds, value $345,985, as compared with 1,475,804 pounds, value $607,076 in 1913-14. In that year 1,440,015 pounds came from Mexico and 35,789 pounds from Germany. Reexports last year were 1,716 pounds most of which went to Chile, and in the pre-war year this was 56,399 pounds, of which 54,149 went to Germany and 2,250 to England.

BALATA

Balata to the amount of 2,384,114 pounds, value $1,260,043, was imported into the United States in 1920 against 1,533,024 pounds, value $793,126 during 1913-14, when the price was about the same as in 1920. Last year almost all, 2,383,578 pounds, came to New York, the principal sources being Venezuela, 468,369 pounds; Dutch Guiana, 221,489 pounds; Colombia, 202,894 pounds; British Guiana, 154,714 pounds; Trinidad and Tobago, 142,228 pounds; French Guiana, 68,996 pounds; Panama, 61,419 pounds; from England came 870,246 pounds and from the Netherlands, 87,320 pounds. Reexports went chiefly to England, 606,505 pounds; Germany, 99,230 pounds; Cuba, 29,120 pounds; Scotland, 22,399 pounds; Japan, 12,726 pounds; Netherlands, 11,200 pounds. The total reexports amounted to 782,919 pounds, value $433,096. During 1913-14 the largest quantity of balata came from Dutch Guiana, 609,992 pounds; the figures for Venezuela, 498,757 pounds, do not show much change. Other large quantities were 104,765 pounds from British Guiana, 236,602 pounds from Panama and 58,185 pounds from Trinidad and Tobago. The amount from England was only 13,751. On the other hand, of the total reexports of 223,983 pounds, value $127,139, England received 104,125 pounds; Germany got 64,296 pounds, Scotland 48,633 pounds and Belgium 6,929 pounds.

RUBBER SCRAP

The importance of rubber scrap among the imports into the United States has fallen off considerably since 1913-14 when the total quantity was 25,958,261 pounds, value $2,063,198, as compared with 12,663,747 pounds, value $909,606 in 1920. During 1913-14 Europe alone supplied 19,845,724 pounds, England's share being 6,074,053 pounds, Russia's 5,018,555 pounds; that of France 3,237,821 pounds and of Germany 1,942,003 pounds. Last year Europe contributed only 7,091,607 pounds and the chief participants in the trade were England, 3,371,318 pounds, and France, 2,100,831 pounds.

Russia and Germany, which supplied considerable quantities before the war, now figure with 14,678 pounds and 76,175 pounds, respectively. Other amounts were 5,188,446 pounds in 1913-14 against 4,197,416 pounds from Canada; 241,879 pounds against 1,628 pounds from Mexico; 184,480 pounds against 657,721 pounds from Cuba; Australia, 17,966 pounds against 65,492 pounds. In 1913-14 Russia in Asia sent 214,380 pounds and Turkey in Asia, 21,403 pounds, while Brazil, which in 1920 sent 356,371 pounds, did not figure on the list at all.

JELUTONG (PONTIANAK)

Receipts of jelutong also show a marked decrease during 1920 as compared with 1913-14, the totals being 12,705,923 pounds, value $2,068,501, against 24,926,571 pounds, value $1,155,402. It is interesting to note that though 1920 imports were half those of 1913-14, the value was about double. Last year most of the jelutong—12,680,190 pounds—arrived at New York, and came from Straits Settlements, 9,207,609 pounds; Dutch East Indies, 2,542,559 pounds; Netherlands, 638,300 pounds; England, 274,145 pounds; France, 43,310 pounds. During 1913-14, 24,626,085 pounds came from the Straits Settlements and only 132,216 pounds from the Dutch East Indies, 124,228 pounds from England and 43,942 pounds from the Netherlands.

EXPORT OF MANUFACTURES OF INDIA RUBBER

The wonderful expansion of the American rubber industry after the war broke out is clearly demonstrated by the grand totals of 1913-14 and 1920. During the former period goods to a value of $12,441,220 were exported; by 1920 this had increased to $85,436,897. Soon after hostilities commenced American shipments of manufactures of rubber began to grow markedly, and the total of 1914-15, $14,767,513, jumped to $35,153,374 in 1915-16. Up to the year 1919 exports remained around the same level but in that year they spurted to $53,865,655.

When the different headings are examined it is seen that druggists' sundries were included in "Other rubber goods" in 1913-14 and that soles and heels, casings, tubes, solid tires for automobiles were not specially reported before 1920, while belting, hose and packing were not separately mentioned prior to 1920.

The most important item in 1913-14, was tires, when the value was $3,505,267 for automobile tires and $563,372 for all other tires. In 1920 the value of automobile tire casings exported was $43,899,502; of tubes, $4,812,980; of solid tires $3,331,789 and of all other tires, $1,029,744, altogether $53,074,015 or almost two-thirds of the total exports of 1920 and nearly equal to the

total exports of 1919, when the figure was $53,865,655.

Europe in 1920 took casings to a value of $18,554,782; tubes valued at $1,643,055; solid tires, $900,452 and other tires, $267,473. To North America went: casings, $7,193,826; tubes, $1,178,285; solid tires $956,800; all other kinds: $341,426. South America took: casings $6,426,412; tubes, $792,407; solid tires, $178,213; all other, $104,155. Oceania came next with: casings, $5,220,430; tubes, $543,021; solid tires, $454,700; all others, $201,505. Asia bought: casings, $3,953,506; tubes, $361,959; solid tires, $763,366; all others: $91,811; and Africa: casings, $2,550,546; tubes, $293,353; solid tires, $76,258; all others, $23,374.

In 1913-14 automobile tires were distributed among the continents as follows: Europe, $1,764,240; North America, $1,254,200; South America, $115,387; Asia, $64,173; Oceania, $279,327; Africa, $27,940. The best customer in Europe was England, both in 1920 and during 1913-14, the figures being $3,712,987 (casings) and $1,503,440 respectively.

In 1920, Sweden came next with $2,260,929 against $77,537; then France, $2,218,026 against $5,448; Spain, $1,625,384 instead of $1,595; Netherlands, $1,592,084 instead of $2,286; Norway, $1,135,919 instead of $5,649. Germany which in 1913-14 took $132,181 worth of tires, bought the comparatively small amount of $422,171 last year. All the countries mentioned showed increases for 1920 as compared with 1919, except France which imported $1,317,152 less during 1920.

In North America, Cuba led last year with $2,671,964; then came Canada with $1,960,745 and Mexico with $1,155,833. Argentina was one of the biggest importers of American casings, the total being $2,792,808; Brazil was an important South American customer, too, with $1,647,066. To Australia went $1,304,950; to New Zealand $1,949,089 and to the Philippines $1,941,201. The Dutch East Indies, with $1,143,205, continued to be our best customer in Asia and British South Africa, with $1,540,192, maintained its leadership in Africa.

The rubber shoe exports of 1920, $9,738,390, contrast well with those for 1913-14 when the total was $834,289. Boots, which had fallen to $714,713 in 1919, picked up again and rose to $1,012,099 in 1920. During 1913-14 the value of boots exported was only $279,206.

The value of belting exports last year was $3,532,277; of hose, $3,340,882, and of packing, $1,525,242. For the fiscal year 1913-14 the amount for the three items together was $2,372,887.

Exports of druggists' rubber sundries continue to increase and were $1,890,957 against $1,270,506 for 1919. Soles and heels, specially mentioned for the first time in 1920, figure on the reports with $984,235.

The difference in the quantity of scrap rubber exported in 1920 and 1913-14 is not very striking, the amounts being 10,468,538 pounds, value $788,097, and 6,207,672 pounds, value $598,287, respectively. However, the years after 1913-14 to and including 1918 showed marked decreases. Reclaimed rubber exports showed decreases both when compared with the year 1919 and the fiscal year 1913-14. The respective totals were: 4,909,214 pounds, value $828,694; 5,070,632 pounds, value $839,938; and 5,583,860 pounds, value $834,440.

IMPORTS OF MANUFACTURED RUBBER

Finally attention may be called to the value of imports of rubber goods in 1920 and 1913-14 when the figures were $1,433,957 and $1,517,789, respectively. In the latter year Germany supplied almost half the amount, the value of her exports to us being $669,491. Last year, the greatest quantity, $885,334, more than half, came from England.

Official India Rubber Statistics for the United States

CALENDAR YEAR 1920

INDIA RUBBER

IMPORTS OF CRUDE INDIA RUBBER BY COUNTRIES (FREE)

From—	Pounds	Value
EUROPE—		
Belgium	1,437,642	$486,430
France	3,588,662	1,117,089
Italy	600,396	302,226
Netherlands	8,859,178	3,898,785
Portugal	2,188,747	587,881
Spain	161,749	23,878
Turkey in Europe	3,440	927
United Kingdom—		
England	75,297,018	34,405,278
Totals, Europe	92,136,832	$40,822,494
NORTH AMERICA—		
Canada	371,334	$344,344
Central American States—		
Costa Rica	10,148	3,161
Guatemala	6,932	1,473
Honduras	3,684	1,291
Nicaragua	130,643	39,525
Panama	36,166	10,915
Salvador	13,010	5,435
Mexico	900,411	267,860
West Indies—		
British—		
Jamaica	1,900	982
Trinidad and Tobago	15,091	8,550
Cuba	44,008	15,400
Dutch	41,863	19,970
Haiti	794	272
Totals, North America	1,575,984	$719,178
SOUTH AMERICA—		
Argentina	3,010	$1,241
Bolivia	100,423	40,074
Brazil	36,981,973	10,533,541
Colombia	766,720	245,887
Ecuador	628,569	154,017
Guiana—		
British	16,551	11,815
Dutch	12,048	8,189
Peru	4,097,701	1,284,589
Uruguay	216,305	83,575
Venezuela	373,830	124,924
Totals, South America	43,197,130	$12,487,852
ASIA—		
China	530,237	$312,230
East Indies—		
British—		
India	3,536,109	1,572,017
Straits Settlements	296,448,104	133,168,879
Other	51,940,226	20,588,941
Dutch	72,374,169	31,147,774
French	3,000	3,000
Hongkong	728,267	308,610
Japan	3,392,943	1,418,237
Siam	68,450	19,549
Totals, Asia	429,021,505	$188,539,237
OCEANIA—		
Australia	37,607	$16,249
Other British Oceania	4,435	2,063
Philippine Islands	203,999	70,050
Totals, Oceania	246,041	$88,362
AFRICA—		
Belgian Congo	103,518	$23,809
British—		
West Africa	218,708	97,549
South Africa	16,609	6,233
East Africa	10,907	3,832
Egypt	17,940	6,997
Portuguese Africa	962	230
Totals, Africa	368,644	$138,650
Calendar year, 1920	566,546,136	$242,795,773
Calendar year, 1919	535,940,421	215,820,113
Calendar year, 1918	325,959,308	146,378,313
Fiscal year, 1917-18	389,599,015	202,800,392
Fiscal year, 1916-17	333,373,711	189,328,674
Fiscal year, 1915-16	267,775,557	155,044,790
Fiscal year, 1914-15	172,068,428	83,030,269
Fiscal year, 1913-14	131,995,742	71,219,851
Fiscal year, 1912-13	113,384,359	90,170,316
Fiscal year, 1911-12	110,210,173	93,013,255
Fiscal year, 1910-11	72,046,260	76,244,603
Fiscal year, 1909-10	101,044,681	101,078,825
Fiscal year, 1908-09	88,359,895	61,709,723
Fiscal year, 1907-08	62,233,160	36,613,185
Fiscal year, 1906-07	76,963,838	58,919,981
Fiscal year, 1905-06	57,844,345	45,114,450

IMPORTS OF CRUDE INDIA RUBBER BY CUSTOMS DISTRICTS (FREE)

At—	Pounds	Value
Maine and New Hampshire	225,735	$124,169
Maryland	234,359	130,574
Massachusetts	2,090,163	756,117
New York	501,590,726	212,755,278
Philadelphia	894,961	375,736
New Orleans	521,425	262,488
San Antonio	527,923	119,261
San Diego	769,948	366,942
Los Angeles	3,299,290	1,732,393
Oregon	3,867,400	1,415,750
San Francisco	21,839,779	9,445,932
Washington	14,217,769	6,590,443
Buffalo	5,845	3,014
Chicago	20	11
Dakota	2,651,241	1,392,594
Michigan	56,205	29,490
Ohio	12,505,669	6,605,614
St. Lawrence	37,079	13,349
Colorado	1,210,599	676,618
Calendar year, 1920	566,546,136	$242,795,773

IMPORTS OF MANUFACTURES OF INDIA RUBBER AND GUTTA PERCHA BY COUNTRIES (DUTIABLE)

[+ indicates increase; — indicates decrease, compared with the preceding year.]

From—	Value
EUROPE—	
Austria	$67,013+
Belgium	56—
Denmark	46+
France	13,003+
Germany	27,690+
Italy	317+
Netherlands	795+
Norway	1,641+
Sweden	93+
Switzerland	28+
United Kingdom—	
England	885,334+
Scotland	42,495+
Ireland	938+
Total Europe	$1,039,449
NORTH AMERICA—	
Canada	$350,579—
Mexico	110+
West Indies—	
British—	
Other British	10+
Cuba	16,221+
Total, North America	$366,920
ASIA—	
China	$15+
East Indies—	
British—	
India	80+
Dutch	355+
Hongkong	12+
Japan	27,126—
Total, Asia	$27,588
Total, Calendar year, 1920	$1,433,957
Total, Calendar year, 1919	956,085
Total, Calendar year, 1918	445,332

	Gutta Percha	India Rubber
Fiscal year, 1917-18	$16,978	$599,763
Fiscal year, 1916-17	173,975	608,954
Fiscal year, 1915-16	57,875	398,020
Fiscal year, 1914-15	10,841	791,281
Fiscal year, 1913-14	42,023	1,517,789
Fiscal year, 1912-13	77,300	1,217,236
Fiscal year, 1911-12	41,098	874,736
Fiscal year, 1910-11	61,283	875,125
Fiscal year, 1909-10	80,567	1,154,347
Fiscal year, 1908-09	71,819	1,391,770
Fiscal year, 1907-08	93,545	1,956,590

IMPORTS OF MANUFACTURES OF INDIA RUBBER AND GUTTA PERCHA BY CUSTOMS DISTRICTS (DUTIABLE)

At—	Value
Connecticut	$57
Georgia	7
Maine and New Hampshire	110
Maryland	2,704
Massachusetts	171,919
New York	863,196
Philadelphia	5,538
Porto Rico	101
Rhode Island	2,893
Virginia	4
Florida	696
Galveston	3,262
New Orleans	704
San Antonio	2,810
Hawaii	4,433
Los Angeles	205
Oregon	799
San Francisco	8,175
Washington	14,548
Buffalo	59,146
Chicago	86,235
Dakota	1,949
Michigan	176,416
Ohio	5,909
Rochester	260
St. Lawrence	1,949
Vermont	3,316
Wisconsin	1,144
Colorado	2
Indiana	231
Kentucky	42
Minnesota	6,541
Pittsburgh	5,783
St. Louis	536
Tennessee	2,337
Calendar year, 1920	$1,433,957

REEXPORTS OF IMPORTED CRUDE INDIA RUBBER

To—	Pounds	Value
Denmark	75	$60
Finland	22,400	5,100
France	309,753	57,239
Germany	582,734	220,706
Italy	510,720	91,930
Netherlands	177,693	81,031
United Kingdom—England	1,758,921	599,962
Canada	5,407,948	1,609,941
Mexico	21,830	9,291
Cuba	149,263	55,447
Chile	22	22
British India	303	77
Straits Settlements	134,798	20,305
Japan	4,798	2,263
Australia	235,800	93,474
New Zealand	250	50
Calendar year, 1920	9,317,308	$2,846,898
Calendar year, 1919	5,111,786	2,205,629
Calendar year, 1918	6,150,755	3,133,622
Fiscal year, 1917-18	8,208,280	4,274,543
Fiscal year, 1916-17	12,355,898	7,304,820
Fiscal year, 1915-16	4,662,889	2,661,331
Fiscal year, 1914-15	6,383,145	3,361,107
Fiscal year, 1913-14	3,747,749	2,398,150
Fiscal year, 1912-13	5,272,387	4,476,379
Fiscal year, 1911-12	5,610,951	4,896,905
Fiscal year, 1910-11	5,267,588	5,439,282
Fiscal year, 1909-10	6,492,947	7,629,380
Fiscal year, 1908-09	3,791,971	2,964,496
Fiscal year, 1907-08	4,110,667	2,994,208
Fiscal year, 1906-07	4,215,350	3,593,912

REEXPORTS OF MANUFACTURES OF INDIA RUBBER AND GUTTA PERCHA

To—	Value
Denmark	$1,034
Greece	370
Norway	617
United Kingdom—England	7,145
Canada	3,413
Mexico	45
Cuba	1,044
Haiti	2,917
Argentina	468
Brazil	202
Colombia	425
Dutch Guiana	9
Uruguay	35
Venezuela	254
British India	1,999
Dutch East Indies	880
Japan	3,517
British South Africa	90
Portuguese Africa	215
Calendar year, 1920	$23,779
Calendar year, 1919	39,743
Calendar year, 1918	40,101

	Gutta Percha	India Rubber
Fiscal year, 1917-18	$18,216	$13,563
Fiscal year, 1916-17	421	10,905
Fiscal year, 1915-16	537	38,649
Fiscal year, 1914-15	.....	7,489
Fiscal year, 1913-14	.....	7,638
Fiscal year, 1912-13	.....	7,973
Fiscal year, 1911-12	65	6,681
Fiscal year, 1910-11	8,687	29,356
Fiscal year, 1909-10	.....	13,568
Fiscal year, 1908-09	.....	36,491
Fiscal year, 1907-08	.....	176,129
Fiscal year, 1906-07	.....	32,712

GUTTA PERCHA

IMPORTS OF CRUDE GUTTA PERCHA BY COUNTRIES (FREE)

From—	Pounds	Value
EUROPE—		
Netherlands	110	$170
United Kingdom—		
England	124,098	21,826
Totals, Europe	124,208	21,996
NORTH AMERICA—		
Mexico	164	$21
West Indies—		
British—		
Trinidad and Tobago	200	42
Totals, North America	364	$63
SOUTH AMERICA—		
Brazil	37,831	$5,162
ASIA—		
East Indies—		
British—		
Straits Settlements	5,093,346	$1,167,970
Dutch	1,852,110	319,771
Siam	1,464	374
Totals, Asia	6,946,920	$1,488,115
OCEANIA—		
Philippine Islands	408	$509
AFRICA—		
British—		
West Africa	19,396	$4,473
Calendar year, 1920	7,129,127	$1,520,309
Calendar year, 1919	6,495,818	1,068,698
Calendar year, 1918	1,207,986	225,922
Fiscal year, 1917-18	1,151,312	147,323
Fiscal year, 1916-17	2,021,794	332,223
Fiscal year, 1915-16	3,188,449	342,226
Fiscal year, 1914-15	1,618,214	230,750
Fiscal year, 1913-14	1,846,109	323,567
Fiscal year, 1912-13	480,853	167,313
Fiscal year, 1911-12	1,204,406	225,797
Fiscal year, 1910-11	1,648,521	390,548
Fiscal year, 1909-10	784,501	167,873
Fiscal year, 1908-09	255,559	82,136
Fiscal year, 1907-08	188,610	100,305
Fiscal year, 1906-07	546,890	201,339
Fiscal year, 1905-06	500,770	188,161

IMPORTS OF CRUDE GUTTA PERCHA BY CUSTOMS DISTRICTS (FREE)

At—	Pounds	Value
Massachusetts	122,188	$20,643
New York	6,910,336	1,489,735
Philadelphia	96,439	9,916
Los Angeles	164	21
Calendar year, 1920	7,129,127	$1,520,309

REEXPORTS OF CRUDE GUTTA PERCHA

To—	Pounds	Value
Mexico	1	$2
Cuba	3,360	1,596
Australia	11,200	5,264
Calendar year, 1920	14,561	$6,862
Calendar year, 1919	12,655	3,611
Calendar year, 1918	126,731	29,015
Fiscal year, 1917-18	202,646	47,211
Fiscal year, 1916-17	763	558
Fiscal year, 1915-16	60,023	11,446
Fiscal year, 1914-15	9,457	4,603
Fiscal year, 1913-14	14,649	5,255
Fiscal year, 1912-13	22,352	2,665
Fiscal year, 1911-12	1,011	945
Fiscal year, 1910-11	62,391	19,235
Fiscal year, 1909-10	74,137	13,886
Fiscal year, 1908-09	9,370	3,730
Fiscal year, 1907-08	.....	.....
Fiscal year, 1906-07	5,000	700

GUAYULE

IMPORTS OF GUAYULE BY COUNTRIES (FREE)

From—	Pounds	Value
NORTH AMERICA—		
Mexico	1,698,859	$345,985
Calendar year, 1920	1,698,859	$345,985
Calendar year, 1919	3,204,224	760,690
Calendar year, 1918	1,376,085	413,484
Fiscal year, 1917-18	4,307,539	1,341,095
Fiscal year, 1916-17	2,854,372	764,484
Fiscal year, 1915-16	2,816,068	880,813
Fiscal year, 1914-15	5,111,849	1,441,367
Fiscal year, 1913-14	1,475,804	607,076
Fiscal year, 1912-13	10,218,191	4,345,088
Fiscal year, 1911-12	14,238,625	6,463,787
Fiscal year, 1910-11	19,749,522	10,443,157

IMPORTS OF GUAYULE BY CUSTOMS DISTRICTS (FREE)

At—	Pounds	Value
San Antonio	1,698,859	$345,985
Calendar year, 1920	1,698,859	$345,985

REEXPORTS OF GUAYULE

To—	Pounds	Value
Canada	50	$43
Chile	1,666	1,083
Calendar year, 1920	1,716	$1,126
Calendar year, 1919	2,210	621
Calendar year, 1918	9,778	2,936

JELUTONG
(PONTIANAK)

IMPORTS OF JELUTONG BY COUNTRIES (FREE)

From—	Pounds	Value
EUROPE—		
France	43,310	$7,464
Netherlands	638,300	69,612
United Kingdom—		
England	274,145	20,022
Totals, Europe	955,755	$97,098
ASIA—		
East Indies—		
British—		
Straits Settlements	9,207,609	$1,627,564
Dutch	2,542,559	343,839
Totals, Asia	11,750,168	$1,971,403
Calendar year, 1920	12,705,923	$2,068,501
Calendar year, 1919	18,662,702	2,213,964
Calendar year, 1918	9,932,476	683,551
Fiscal year, 1917-18	7,481,292	474,366
Fiscal year, 1916-17	.....	.....
Fiscal year, 1915-16	27,858,335	1,322,262
Fiscal year, 1914-15	14,851,264	731,995
Fiscal year, 1913-14	24,926,571	1,155,402
Fiscal year, 1912-13	45,345,338	2,174,441
Fiscal year, 1911-12	48,795,268	2,255,050
Fiscal year, 1910-11	51,420,872	2,872,633
Fiscal year, 1909-10	52,392,444	2,419,223
Fiscal year, 1908-09	24,826,296	852,372
Fiscal year, 1907-08	22,803,303	1,039,776
Fiscal year, 1906-07	28,437,660	1,085,098

IMPORTS OF JELUTONG BY CUSTOMS DISTRICTS (FREE)

At—	Pounds	Value
New York	12,680,190	$2,065,052
San Francisco	25,733	3,449
Calendar year, 1920	12,705,923	$2,068,501

REEXPORTS OF JELUTONG

To—	Pounds	Value
Canada	433,455	$71,560
Calendar year, 1920	433,455	$71,560
Calendar year, 1919	163,034	26,873

BALATA

IMPORTS OF BALATA BY COUNTRIES (FREE)

From—	Pounds	Value
EUROPE—		
Netherlands	87,320	$57,588
United Kingdom—		
England	870,246	395,575
Totals, Europe	957,566	$453,163
NORTH AMERICA—		
Central American States—		
Guatemala	2,382	$732
Nicaragua	2,995	1,500
Panama	61,419	24,501
West Indies—		
British—		
Trinidad and Tobago	142,228	93,874
Totals, North America	209,024	$120,607
SOUTH AMERICA—		
Bolivia	4,296	$2,638
Brazil	8,000	5,837
Colombia	202,894	88,203
Ecuador	2,336	935
Guiana—		
British	154,714	111,299
Dutch	221,489	151,108
French	68,996	48,276
Peru	7,570	2,331
Venezuela	468,369	239,854
Totals, South America	1,138,664	$650,481
ASIA—		
East Indies—		
British—		
Straits Settlements	33,600	$20,439
Other British	45,260	15,353
Totals, Asia	78,860	$35,792
Calendar year, 1920	2,384,114	$1,260,043
Calendar year, 1919	1,628,134	937,038
Calendar year, 1918	1,547,338	836,383
Fiscal year, 1917-18	2,449,881	1,278,610
Fiscal year, 1916-17	3,287,445	1,649,452
Fiscal year, 1915-16	2,544,405	996,102
Fiscal year, 1914-15	2,472,224	963,384
Fiscal year, 1913-14	1,533,024	793,126
Fiscal year, 1912-13	1,318,598	766,772
Fiscal year, 1911-12	1,517,066	984,012
Fiscal year, 1910-11	878,305	624,702
Fiscal year, 1909-10	399,003	196,878
Fiscal year, 1908-09	1,157,018	$22,872
Fiscal year, 1907-08	584,582	276,756
Fiscal year, 1906-07	799,029	305,041
Fiscal year, 1905-06	374,220	152,689

IMPORTS OF BALATA BY CUSTOMS DISTRICTS (FREE)

At—	Pounds	Value
New York	2,383,578	$1,259,815
Porto Rico	73	43
San Francisco	463	185
Calendar year, 1920	2,384,114	$1,260,043

REEXPORTS OF BALATA

To—	Pounds	Value
Germany	99,230	$55,190
Netherlands	11,206	8,512
United Kingdom—		
England	606,505	334,768
Scotland	22,399	13,800
Bermuda	50	23
Canada	529	2,065
Mexico	2	1
Cuba	29,120	9,919
Brazil	1,158	1,387
Japan	12,726	7,431
Calendar year, 1920	782,919	$433,096
Calendar year, 1919	351,477	206,118
Calendar year, 1918	706,185	436,252
Fiscal year, 1917-18	473,915	303,338
Fiscal year, 1916-17	879,765	474,538
Fiscal year, 1915-16	667,168	245,329
Fiscal year, 1914-15	1,076,619	426,735
Fiscal year, 1913-14	223,983	127,139
Fiscal year, 1912-13	118,334	77,963
Fiscal year, 1911-12	62,529	38,423
Fiscal year, 1910-11	264,589	235,575
Fiscal year, 1909-10	.....	42,750
Fiscal year, 1908-09	.....	223,907
Fiscal year, 1907-08	.....	18,741
Fiscal year, 1906-07	.....	12,659

SUBSTITUTES, ELASTICON, ETC.

IMPORTS OF ELASTICON AND SIMILAR SUBSTITUTES FOR INDIA RUBBER BY COUNTRIES (DUTIABLE)

From—	Pounds	Value
EUROPE—		
United Kingdom—		
England	75,790	$13,791
NORTH AMERICA—		
Canada	444	155
Calendar year, 1920	76,234	$13,946
Calendar year, 1919	392,092	47,966
Calendar year, 1918	.....	383,497
Fiscal year, 1917-18	.....	136,438
Fiscal year, 1916-17	.....	39,815
Fiscal year, 1915-16	.....	16,179
Fiscal year, 1914-15	.....	30,349
Fiscal year, 1913-14	.....	87,642
Fiscal year, 1912-13	.....	97,452
Fiscal year, 1911-12	.....	87,328
Fiscal year, 1910-11	.....	115,601
Fiscal year, 1909-10	.....	114,516
Fiscal year, 1908-09	.....	60,625
Fiscal year, 1907-08	.....	27,000

IMPORTS OF ELASTICON AND SIMILAR SUBSTITUTES OF INDIA RUBBER BY CUSTOMS DISTRICTS (DUTIABLE)

At—	Pounds	Value
Maine and New Hampshire	4	$5
New York	35,790	6,966
Rhode Island	40,000	6,825
Buffalo	40	2
Dakota	400	148
Calendar year, 1920	76,234	$13,946

REEXPORTS OF ELASTICON AND SIMILAR SUBSTITUTES OF INDIA RUBBER BY COUNTRIES

To—	Pounds	Value
France	14,540	$10,553
United Kingdom—		
England	44,217	14,604
Canada	3,042	1,398
Mexico	2,450	1,052
Trinidad and Tobago	50	37
Venezuela	125	30
Calendar year 1920	64,424	$27,674
Calendar year, 1919	375	357
Calendar year, 1918	.....	65,765
Fiscal year, 1917-1918	.....	11,098

SCRAP RUBBER[a]

IMPORTS OF SCRAP RUBBER BY COUNTRIES (FREE)

From—	Pounds	Value
EUROPE—		
Belgium	31,160	$2,181
Denmark	66,830	5,136
France	2,100,831	160,771
Germany	76,175	5,459
Greece	2,878	181
Italy	842,706	132,882
Netherlands	39,770	2,855
Norway	109,483	8,216
Portugal	60,806	4,256
Russia in Europe	14,678	1,334
Sweden	281,217	27,870
Switzerland	79,661	4,282
Turkey in Europe	14,094	679
United Kingdom—		
England	3,371,318	241,735
Totals, Europe	7,091,607	$597,837
NORTH AMERICA—		
Canada	4,197,416	$230,022
Central American States—		
Costa Rica	1,507	194
Panama	43,470	1,448
Mexico	1,628	16
Newfoundland and Labrador	100,758	7,185
West Indies—		
Other British	1,050	90
Cuba	657,721	29,353
Totals, North America	5,003,550	$268,310
SOUTH AMERICA—		
Brazil	356,371	$16,494
Venezuela	1,727	85
Totals, South America	358,098	$16,579
ASIA—		
Japan	145,000	$24,770
OCEANIA—		
Australia	65,492	$2,110
Calendar year, 1920	12,663,747	$909,606
Calendar year, 1919	10,777,225	825,619
Calendar year, 1918	8,526,420	645,581
Fiscal year, 1917-18	13,980,303	1,019,222
Fiscal year, 1916-17	20,517,328	1,569,448
Fiscal year, 1915-16	16,371,573	1,271,903
Fiscal year, 1914-15	11,006,928	726,914
Fiscal year, 1913-14	25,958,261	2,063,198
Fiscal year, 1912-13	43,385,456	3,709,238
Fiscal year, 1911-12	26,293,192	2,095,605
Fiscal year, 1910-11	26,948,000	2,334,870
Fiscal year, 1909-10	37,364,671	2,998,697
Fiscal year, 1908-09	20,497,695	1,543,267
Fiscal year, 1907-08	16,331,035	1,496,822
Fiscal year, 1906-07	29,335,193	2,607,987

IMPORTS OF SCRAP RUBBER BY CUSTOMS DISTRICTS (FREE)

At—	Pounds	Value
Maine and New Hampshire	457,194	$31,538
Massachusetts	394,143	23,616
New York	7,870,499	626,821
Philadelphia	31,115	3,327
Florida	60,000	3,445
Hawaii	1,000	73
Los Angeles	1,628	16
Washington	250,492	29,166
Buffalo	2,278,670	122,613
Chicago	215,731	12,329
Dakota	52,538	3,840
Duluth and Superior	40,824	370
Michigan	133,636	6,161
Ohio	81,224	8,749
St. Lawrence	316,597	16,010
Vermont	478,456	21,532
Calendar year, 1920	12,663,747	$909,606

REEXPORTS OF SCRAP RUBBER

To—	Pounds	Value
Canada	53,573	$10,224
Nicaragua	330	31
Cuba	4,500	705
Colombia	1,875	169
Calendar year, 1920	60,278	$11,129
Calendar year, 1919	1,870	206
Calendar year, 1918	58,574	16,032
Fiscal year, 1917-18	74,497	16,965
Fiscal year, 1916-17	1,626	215
Fiscal year, 1915-16	9,204	734
Fiscal year, 1914-15	3,483	373
Fiscal year, 1913-14	24,295	2,450
Fiscal year, 1912-13	87,930	10,723
Fiscal year, 1911-12	302,105	28,196
Fiscal year, 1910-11	401,231	43,338
Fiscal year, 1909-10	61,395	5,373
Fiscal year, 1908-09	38,506	2,093
Fiscal year, 1907-08	21,713	2,941
Fiscal year, 1906-07	105,463	9,444

[a]For exports of scrap and reclaimed rubber, see table on pages 68 and 70.

EXPORTS OF INDIA RUBBER MANUFACTURES AND INSULATED WIRE AND CABLE FROM THE UNIT

EXPORTED TO—	Scrap and Old		Reclaimed		Belting†	Hose†	Packing†	Boots
EUROPE	Pounds	Value	Pounds	Value	Value	Value	Value	Pairs
Austria-Hungary	.....	.....	.....	.....	.....	$3,334	.....	11,865
Azores and Madeira	.....	.....	.....	.....	.....	.....	.....	.....
Belgium	158,531	$14,801	33,833	$5,854	$5,282	9,689	$6,921	72
Bulgaria	.....	.....	.....	.....	.....	5,692	621	.....
Czechoslovakia	.....	.....	.....	.....	.....	.....	.....	.....
Denmark	.....	.....	650	125	9,054	5,852	4,385	15,074
Finland	.....	.....	.....	.....	28,140	5,524	4,545	.....
France	1,360,961	115,684	100	18	77,873	3,516	16,260	306
Germany	1,270,627	120,114	11,210	1,996	7,003	2,667	63	1
Gibraltar	.....	.....	.....	.....	.....	1	.....	.....
Greece	.....	.....	.....	.....	7,161	5,776	2,136	110
Iceland and Faroe Islands	.....	.....	.....	.....	.....	.....	.....	16,005
Italy	.....	.....	.....	.....	9,295	5,649	3,827	517
Malta, Gozo and Cyprus Islands	.....	.....	.....	.....	.....	.....	.....	1
Netherlands	23,122	2,240	65,751	13,783	17,513	72,176	12,433	12
Norway	.....	.....	.....	.....	27,506	66,376	3,843	17,100
Poland and Danzig	.....	.....	.....	.....	70	.....	.....	60
Portugal	.....	.....	.....	.....	5,484	1,121	8	1,906
Rumania	.....	.....	.....	.....	1,246	15,824	2,446	.....
Russia in Europe	.....	.....	.....	.....	3,239	1,118	.....	18
Spain	469,256	42,917	.....	.....	16,296	12,690	5,101	152
Sweden	108,761	16,845	124,050	21,415	71,476	49,505	20,515	3,216
Switzerland	.....	.....	.....	.....	17,883	2,935	624	796
Turkey in Europe	.....	.....	.....	.....	16	4,449	645	10,622
United Kingdom—								
England	938,582	98,696	207,736	33,601	98,721	560,187	115,061	36,870
Scotland	372,603	34,935	282,959	46,400	22,399	201	22,777	3,492
Ireland	.....	.....	.....	.....	10,778	.....	.....	.....
Jugoslavia, Albania, etc.	.....	.....	.....	.....	.....	.....	.....	36
TOTALS, EUROPE	4,702,443	$446,232	726,289	$123,192	$436,435	$834,282	$222,211	118,231
NORTH AMERICA								
Bermuda	.....	.....	.....	.....	$1,548	$4,857	$1,457	217
British Honduras	.....	.....	.....	.....	771	595	458	774
Canada	2,011,527	$158,519	4,039,397	$684,806	270,939	146,891	117,685	50,984
Costa Rica	.....	.....	.....	.....	6,162	7,108	1,201	1
Guatemala	.....	.....	.....	.....	19,996	4,483	3,404	108
Honduras	.....	.....	.....	.....	5,733	15,069	5,057	1
Nicaragua	.....	.....	.....	.....	16,742	6,514	3,342	57
Panama	.....	.....	.....	.....	21,906	81,419	19,662	397
Salvador	.....	.....	.....	.....	6,450	2,758	2,069	168
Greenland	.....	.....	.....	.....	.....	.....	.....	.....
Mexico	5,321	518	.....	.....	465,700	554,450	234,333	619
Miquelon, Langley, etc.	.....	.....	.....	.....	.....	.....	.....	8,846
Newfoundland and Labrador	.....	.....	.....	.....	29,203	8,926	1,734	63,365
Barbados	.....	.....	.....	.....	1,809	517	87	.....
Jamaica	.....	.....	.....	.....	2,732	8,660	4,108	120
Trinidad and Tobago	.....	.....	.....	.....	4,547	9,817	5,228	67
Other British West Indies	.....	.....	.....	.....	1,421	1,327	407	12
Cuba	.....	.....	8,112	1,751	129,899	339,469	273,301	3,216
Dominican Republic	.....	.....	.....	.....	5,482	13,338	11,296	.....
Dutch West Indies	.....	.....	.....	.....	13	1,057	127	.....
French West Indies	.....	.....	.....	.....	4,077	793	73	30
Haiti	1,200	$210	.....	.....	838	2,045	504	18
Danish West Indies	.....	.....	.....	.....	112	.....	.....	.....
Virgin Islands of United States	.....	.....	.....	.....	.....	5,318	808	.....
TOTALS, NORTH AMERICA	2,018,048	$159,247	4,047,509	$686,557	$996,080	$1,215,411	$686,341	129,000
SOUTH AMERICA								
Argentina	.....	.....	.....	.....	$200,337	$150,579	$40,114	1,838
Bolivia	.....	.....	.....	.....	17,141	4,769	1,133	229
Brazil	.....	.....	.....	.....	150,170	153,099	27,730	1,020
Chile	.....	.....	.....	.....	239,927	125,836	26,052	3,418
Colombia	.....	.....	15	$3	14,186	17,719	7,451	25
Ecuador	.....	.....	.....	.....	2,004	6,282	2,333	4
British Guiana	.....	.....	.....	.....	8,942	2,714	1,434	.....
Dutch Guiana	.....	.....	.....	.....	62	1,549	347	.....
French Guiana	.....	.....	.....	.....	.....	320	30	.....
Paraguay	.....	.....	.....	.....	3,792	346	370	.....
Peru	.....	.....	.....	.....	46,019	57,930	23,965	806
Uruguay	.....	.....	.....	.....	18,475	37,808	6,756	2
Venezuela	.....	.....	.....	.....	11,183	9,758	5,970	.....
TOTALS, SOUTH AMERICA	.....	.....	15	$3	$712,238	$568,709	$143,685	7,342
ASIA								
Aden	.....	.....	.....	.....	.....	.....	.....	.....
China	.....	.....	.....	.....	$68,375	$41,687	$25,995	2,712
Kwangtung, leased territory	.....	.....	.....	.....	.....	534	.....	1
Chosen	.....	.....	.....	.....	3,485	1,099	220	.....
British India	.....	.....	.....	.....	39,191	42,592	20,300	248
Straits Settlements	.....	.....	.....	.....	9,917	1,961	4,443	.....
Other British East Indies	.....	.....	.....	.....	2,488	858	103	.....
Dutch East Indies	67	$15	.....	.....	12,035	45,109	6,819	.....
French Indo-China	.....	.....	.....	.....	15,587	2,288	.....	.....
Hongkong	84,000	3,032	.....	.....	380	4,054	6,294	192
Japan	3,663,980	179,571	134,976	$18,857	242,596	85,166	134,489	22,523
Persia	.....	.....	.....	.....	.....	.....	.....	.....
Russia in Asia	.....	.....	.....	.....	8	451	.....	476
Siam	.....	.....	.....	.....	677	.....	36	1
Turkey in Asia	.....	.....	.....	.....	789	1,364	.....	103
TOTALS, ASIA	3,748,047	$182,618	134,976	$18,857	$395,528	$227,163	$198,699	26,256

THE UNITED STATES BY COUNTRIES DURING THE CALENDAR YEAR 1920

Boots Value	Shoes Pairs	Shoes Value	Soles and Heels¶ Value	Automobile Tires: Casings¶ Value	Automobile Tires: Inner Tubes¶ Value	Automobile Tires: Solid Tires¶ Value	Automobile Tires: All Others Value	Druggists' Rubber Sundries Value	All Other Manufactures of Rubber Value	Totals Value	Insulated Wire and Cables¶ Value
$59,870	2,136	$2,200	.....	$114,347	$10,453	$10,000	$49	.....	$1,611	$201,864	.....
.....	240	287	$333	425	16	180	.....	$38	50	1,329	.....
260	76,088	76,599	2,482	1,139,526	96,792	42,991	2,786	3,531	76,765	1,484,279	$72,730
.....	16,200	20,655	.....	2,701	604	339	.....	200	498	31,310	10
.....	.....	.....	.....	21,488	1,812	.....	10	.....	275	23,585	.....
34,323	414,933	392,576	20,503	825,038	64,230	69,973	21,476	18,831	93,103	1,559,469	58,484
.....	448,011	423,502	138	174,559	21,569	44,751	14,391	1,231	17,999	736,349	13,380
1,729	426,158	309,817	3,960	2,218,026	101,228	49,764	36,138	99,171	509,296	3,542,480	101,711
6	17,937	30,880	22	422,171	55,186	11,143	115	2,449	19,253	673,068	1,518
.....	696	733	.....	2,868	158	.....	.....	.....	49	3,809	4
428	17,981	19,009	3,120	335,193	60,483	5,499	2,067	4,361	22,148	467,381	22,469
49,622	6,966	7,502	.....	3,481	134	.....	.....	14	5,632	66,385	1,436
1,578	110,846	104,871	23,342	972,509	86,595	1,732	12,643	26,498	71,352	1,319,891	124,109
5	384	411	.....	3,066	355	300	.....	48	1,586	5,771	.....
45	107,547	106,010	1,281	1,592,084	170,461	50,604	15,826	47,850	119,796	2,222,102	298,490
71,005	1,412,739	1,228,176	15,556	1,135,919	82,427	212,040	9,574	17,133	105,263	2,974,818	592,214
224	88,812	75,817	.....	120,147	22,204	7,667	.....	125	5,891	232,145	41,092
6,844	10,482	8,197	50	351,002	24,312	758	3,629	4,885	7,083	413,373	38,063
.....	40,576	51,859	16	563,418	33,948	9,688	.....	236	1,644	680,325	17,658
.....	.....	.....	.....	.....	.....	.....	.....	460	324	33,357	.....
132	9,026	14,515	.....	10,393	3,176	.....	.....	57,087	110,564	2,349,318	77,890
490	153,728	144,838	21,285	1,625,384	155,810	143,991	12,865	60,801	157,668	3,240,371	125,400
11,118	182,539	157,137	2,154	2,260,929	247,322	110,852	52,634	8,219	47,418	956,749	50,800
2,120	259,953	229,091	2,396	660,597	27,840	222	17,404	1,056	6,265	1,006,783	3,597
32,567	546,488	743,611	1,955	196,451	12,741	6,642	385	223,725	1,514,937	8,623,888	450,084
94,835	1,950,311	1,562,123	77,844	3,712,987	349,772	121,233	60,166	80	17,146	399,027	5
8,284	122,127	97,103	100	132,205	12,006	83	5,308	.....	9,325	39,340	.....
.....	980	790	16,308	2,092	40	.....	7	.....	250	20,011	.....
120	.....	.....	1,584	15,776	2,281	.....	.....	.....	.....	.....	.....
$375,605	6,423,884	$5,809,309	$194,429	$18,554,782	$1,643,955	$900,452	$267,473	$578,029	$2,923,191	$33,308,577	$2,091,144
$749	9,371	$14,477	$2,993	.....	.....	$340	$1,459	$2,203	$5,360	$35,443	$10,275
1,319	20,658	29,571	1,161	$5,578	$1,634	.....	520	324	2,011	43,942	1,152
196,102	119,966	165,607	9,714	1,960,745	416,709	326,776	127,438	320,597	2,365,412	7,267,940	271,351
6	1,880	2,522	6,717	11,507	1,000	3,061	541	5,002	11,133	55,960	21,953
188	10,551	14,598	10,325	46,151	13,971	1,654	3,788	8,057	13,276	139,891	25,112
3	7,251	10,133	4,462	20,376	2,904	3,175	1,034	2,230	15,652	85,828	10,221
235	9,822	11,844	12,461	23,670	2,348	1,812	1,014	4,049	12,439	96,470	15,278
1,225	77,325	89,454	24,289	367,756	61,258	56,267	30,888	9,076	38,343	801,543	237,619
200	2,592	1,916	37,190	72,333	14,039	11,702	648	3,138	6,073	158,516	19,313
.....	.....	.....	.....	.....	.....	.....	.....	.....	404	404	.....
3,075	218,462	242,692	54,547	1,155,833	195,135	87,809	31,779	108,995	383,201	3,518,067	586,285
31,057	660	554	.....	20	.....	.....	.....	.....	187	31,818	43
212,770	17,406	17,430	9,336	25,530	5,284	1,057	2,773	2,698	15,130	331,871	16,002
.....	4,765	6,856	770	24,566	2,374	252	710	117	3,668	41,726	2,195
233	33,723	45,636	8,528	239,970	18,737	12,674	2,440	2,742	14,322	360,782	12,984
74	72,510	64,958	6,350	145,911	18,143	19,946	7,252	5,168	9,591	296,985	11,135
48	23,578	28,850	697	48,357	5,780	14,126	3,912	586	5,032	110,543	6,630
7,530	1,229,909	1,207,341	163,353	2,671,964	358,280	379,742	106,345	216,828	440,011	6,295,814	944,387
.....	18,298	24,198	9,475	218,046	35,510	20,886	12,688	14,732	46,895	412,546	47,697
.....	12,103	15,630	833	17,870	5,384	67	217	566	2,016	43,780	2,212
30	60	81	44	50,382	4,778	12,259	1,256	479	1,465	75,717	2,921
51	2,256	3,413	5,271	69,041	12,211	2,563	3,039	1,870	10,177	111,253	14,057
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	112	.....
.....	11,697	18,154	3,090	18,220	2,806	632	1,665	665	977	52,335	713
$454,895	1,904,843	$2,015,915	$371,606	$7,193,826	$1,178,285	$956,800	$341,426	$710,122	$3,402,775	$20,369,286	$2,259,535
$4,769	153,358	$159,621	$32,710	$2,792,808	$307,143	$26,938	$42,675	$96,666	$414,411	$4,268,771	$465,193
1,735	7	9	9	28,371	2,593	1,100	841	2,552	3,937	64,190	29,705
4,102	269,023	261,346	144,094	1,647,066	242,539	75,596	17,116	82,642	287,163	3,092,663	1,266,802
19,113	54,893	53,317	2,275	446,674	50,168	28,793	18,742	23,143	136,610	1,170,650	136,049
80	18,786	22,935	18,221	153,755	23,332	6,772	6,598	47,584	48,575	367,211	98,119
13	13,706	11,777	831	47,390	4,335	602	662	9,412	10,073	95,714	18,686
.....	29,979	40,689	2	40,378	8,000	2,614	418	405	5,063	110,659	8,508
.....	468	580	382	4,791	437	290	4,511	430	3,754	17,133	767
.....	48	29	150	406	14	.....	.....	.....	467	1,416	.....
.....	.....	.....	.....	1,120	125	.....	.....	395	1,023	7,171	1,433
6,732	11,934	14,544	678	210,427	30,743	22,528	2,740	17,997	45,870	480,173	164,930
5	57,330	54,920	17,190	808,621	85,264	9,802	3,721	27,422	81,960	1,151,944	55,435
.....	941	914	5,351	244,605	37,714	3,178	6,131	44,161	47,435	416,400	51,404
$36,549	610,473	$620,681	$221,893	$6,426,412	$792,407	$178,213	$104,155	$352,809	$1,086,341	$11,244,095	$2,297,031
.....	13	$21	.....	$15,042	$1,672	.....	$378	.....	.....	$17,113	.....
$7,377	43,241	42,669	$2,462	359,710	42,652	$19,002	11,977	$42,722	$100,113	764,741	$562,483
4	50,061	59,421	.....	3,710	.....	.....	.....	.....	.....	63,669	.....
.....	1,431	1,547	.....	13,545	3,421	.....	47	545	227	24,136	148
631	26,507	40,683	4,375	868,158	118,671	109,548	21,482	34,901	67,325	1,367,857	185,607
.....	24,042	27,220	35	971,762	49,729	87,709	2,529	5,908	27,948	1,189,161	11,516
.....	2,170	2,695	48	34,657	6,349	1,803	382	109	2,922	52,414	125
.....	2,431	2,387	858	1,143,205	77,644	491,675	23,707	7,674	43,915	1,855,243	111,833
.....	.....	.....	.....	4,728	823	1,043	.....	39	327	24,835	277
.....	12,248	15,135	108	27,339	3,876	10,053	1,252	4,427	13,544	89,938	33,748
444	400,880	453,353	1,403	417,584	41,638	32,024	28,499	14,302	239,984	1,948,474	49,371
59,008	20,166	15,571	.....	5,880	2,211	.....	.....	932	5	24,599	.....
.....	43,657	35,881	.....	17,474	449	.....	.....	1,366	244	57,571	.....
1,698	1,315	1,145	.....	16,602	290	1,951	370	905	3,445	25,426	69
5	28,788	30,707	1,932	54,110	12,534	10,558	1,188	6,848	11,892	132,145	158
$69,390	656,950	$728,635	$11,221	$3,953,506	$361,959	$765,366	$91,811	$120,678	$511,891	$7,637,322	$955,335

	Scrap and Old		Reclaimed		Belting¶	Hose¶	Packing¶	Boots
	Pounds	Value	Pounds	Value	Value	Value	Value	Pairs
OCEANIA								
Australia	.....	.....	.....	.....	$191,712	$79,613	$42,599	2,000
New Zealand	.....	.....	425	$85	81,481	26,841	20,421	15,785
Other British Oceania	.....	.....	.....	.....	.....	955	.....	.....
French Oceania	.....	.....	.....	.....	384	1,448	463	6
German Oceania	.....	.....	.....	.....	.....	.....	.....	.....
Philippine Islands	.....	.....	.....	.....	183,257	96,505	82,165	3,571
Other Oceania	.....	.....	.....	.....	.....	.....	.....	24
TOTALS, OCEANIA	.....	.....	425	$85	$456,834	$205,362	$145,648	21,386
AFRICA	Pounds	Value	Pounds	Value	Value	Value	Value	Pairs
Abyssinia	.....	.....	.....	.....	.....	.....	.....	.....
Belgian Kongo	.....	.....	.....	.....	.....	$3,431	$350	.....
British West Africa	.....	.....	.....	.....	.....	1,471	1,840	89
British South Africa	.....	.....	.....	.....	$477,016	264,020	122,891	500
British East Africa	.....	.....	.....	.....	4,080	30	47	24
Canary Islands	.....	.....	.....	.....	.....	26	.....	.....
French Africa	.....	.....	.....	.....	47,883	235	1,198	.....
Kamerun, etc.	.....	.....	.....	.....	.....	3,366	.....	.....
Liberia	.....	.....	.....	.....	.....	.....	.....	.....
Morocco	.....	.....	.....	.....	.....	.....	.....	.....
Portuguese Africa	.....	.....	.....	.....	5,535	4,901	2,332	24
Egypt	.....	.....	.....	.....	648	12,475	.....	.....
Madagascar	.....	.....	.....	.....	.....	.....	.....	.....
TOTALS, AFRICA	.....	.....	.....	.....	$535,162	$289,955	$128,658	637
Calendar year, 1920	10,468,538	$788,097	4,909,214	$828,694	¶$3,532,277	¶$3,340,882	¶$1,525,242	302,852
					Belting, Hose and Packing			
Calendar year, 1919	8,292,053	$808,993	5,070,632	$839,338	.....	$6,100,460	.....	261,110
§Calendar year, 1918	2,931,929	287,883	2,904,234	502,176	.....	4,525,243	.....	722,586
Fiscal year, 1917-18	2,117,257	235,811	3,284,958	567,278	.....	4,578,396	.....	1,559,598
Fiscal year, 1916-17	3,696,661	415,526	4,938,991	814,199	.....	3,532,384	.....	600,455
Fiscal year, 1915-1916	3,904,715	400,148	6,406,946	871,262	.....	2,986,953	.....	720,130
Fiscal year, 1914-15	2,422,091	291,421	5,970,380	822,561	.....	1,807,848	.....	318,727
Fiscal year, 1913-14	6,207,672	598,287	5,583,860	834,440	.....	2,372,887	.....	101,361
Fiscal year, 1912-13	7,269,465	880,442	5,413,247	932,904	.....	2,605,551	.....	109,528
Fiscal year, 1911-12	7,336,984	$780,188	5,397,806	$875,501	.....	$2,315,484	.....	.....
Fiscal year, 1910-11	7,049,729	723,664	4,994,527	781,650	.....	2,163,416	.....	.....
Fiscal year, 1909-10	6,143,610	578,944	3,622,556	535,795	.....	1,960,825	.....	.....
Fiscal year, 1908-09	4,071,795	402,897	3,196,551	414,861	.....	1,498,445	.....	.....
Fiscal year, 1907-08	4,255,789	449,727	2,947,974	418,738	.....	1,347,775	.....	.....
Fiscal year, 1906-07	4,756,621	548,695	4,550,788	665,109	.....	1,253,369	.....	.....
Fiscal year, 1905-06	.....	.....	4,084,696	511,843	.....	1,221,159	.....	.....
Fiscal year, 1904-05	.....	.....	*	522,902	.....	994,100	.....	.....
Fiscal year, 1903-04	.....	.....	.....	.....	.....	880,010	.....	.....
Fiscal year, 1902-03	.....	.....	.....	.....	.....	819,985	.....	.....
Fiscal year, 1901-02	.....	.....	.....	.....	.....	634,146	.....	.....
Fiscal year, 1900-01	.....	.....	.....	.....	.....	565,726	.....	.....

*Not officially reported. **States separately after 1912. †Tires were not specifically reported before 1910-11. ‡Druggists' rubber sundries were not reported before 1920.

Compiled by the Bureau of Foreign Commerce, Department of Commerce, Washington, D. C.

EXPORTS OF UNITED STATES RUBBER MANUFACTURES AND INSULATED WIRE AND CABLE

	Scrap and Old		Reclaimed		Belting¶	Hose¶	Packing¶	Boots
From—	Pounds	Value	Pounds	Value	Value	Value	Value	Pairs
Georgia	.....	.....	.....	.....	.....	$1,800	$17,544	.....
Maine and New Hampshire	7,563	$286	.....	.....	$9,966	2,546	322	9,337
Maryland	.....	.....	.....	.....	29,126	21,059	2,078	728
Massachusetts	274,113	23,467	.....	.....	40,689	40,851	4,349	90,373
New York	3,805,889	387,804	720,162	$119,348	2,062,954	2,156,926	930,656	125,359
Philadelphia	656,280	37,968	79,235	13,182	8,567	345,789	65,349	230
Porto Rico	.....	.....	.....	.....	1,227	776	1,757	.....
Rhode Island	.....	.....	.....	.....	.....	.....	.....	.....
South Carolina	.....	.....	.....	.....	.....	.....	.....	.....
Virginia	.....	.....	.....	.....	182	5,755	1,480	.....
Florida	.....	.....	.....	.....	4,032	16,895	540	.....
Galveston	.....	.....	.....	.....	7,761	12,301	2,101	.....
Mobile	.....	.....	.....	.....	1,040	2,515	329	2,335
New Orleans	.....	.....	.....	.....	63,141	115,802	36,578	972
Sabine	.....	.....	.....	.....	6,964	46,694	8,503	40
Arizona	.....	.....	.....	.....	71,074	26,306	7,841	68
El Paso	.....	.....	.....	.....	80,391	22,824	10,542	27
San Antonio	4,520	284	.....	.....	170,370	86,465	39,064	240
Alaska	.....	.....	.....	.....	52	541	8	328
Hawaii	145,175	4,949	.....	.....	.....	.....	585	.....
Los Angeles	8,016	300	.....	.....	2,394	1,031	35	29
Oregon	23,205	990	.....	.....	51	400	.....	76
San Diego	.....	.....	.....	.....	3,145	2,356	86	38
San Francisco	2,351,702	117,586	425	85	640,682	257,128	253,522	14,152
Washington	1,148,150	48,906	69,995	11,273	98,282	38,680	20,777	5,212
Puffalo	422,068	49,586	2,770,713	468,734	93,714	63,269	70,384	5,463
Dakota	37,757	4,307	.....	.....	46,212	13,830	10,468	5,586
Duluth and Superior	.....	.....	.....	.....	19,164	1,857	1,886	696
Michigan	846,768	62,213	220,113	38,271	23,462	25,792	6,439	37,331
Montana and Idaho	.....	.....	.....	.....	3,292	103	41	26
Ohio	83,121	2,554	.....	.....	57	.....	60	.....
Rochester	.....	.....	.....	.....	.....	.....	.....	.....
St. Lawrence	245,099	12,158	352,925	56,438	26,268	16,441	28,620	373
Vermont	409,112	34,739	695,646	121,363	18,018	14,150	3,398	3,833
Totals	10,468,538	$788,097	4,909,214	$828,694	$3,532,277	$3,340,882	$1,525,242	302,852

¶Not specifically reported before 1920.

Boots Value	Shoes Pairs	Shoes Value	Soles and Heels¶ Value	Automobile Tires Casings¶ Value	Automobile Tires Inner Tubes¶ Value	Automobile Tires Solid Tires¶ Value	Automobile Tires All Others Value	Druggists' Rubber Sundries Value	All Other Manufactures of Rubber Value	Totals Value	Insulated Wire and Cables¶ Value
$6,907	60,334	$36,407	$2,025	$1,304,950	$142,478	$50,884	$44,041	$49,129	$169,686	$2,120,431	$54,865
57,904	24,928	30,612	23,007	1,949,089	116,526	190,584	57,132	18,362	136,945	2,708,789	79,817
.....	1,195	1,822	.....	11,086	1,534	573	265	78	177	16,490	449
32	7,406	10,859	45	9,838	1,238	2,643	1,979	308	1,432	30,669	565
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	137
8,149	330,837	415,567	120,613	1,941,201	281,110	208,941	97,785	35,003	256,426	3,726,722	431,321
96	1,170	1,425	.....	4,266	135	1,275	303	50	361	7,911	.....
$73,088	425,870	$496,692	$145,690	$5,220,430	$543,021	$454,700	$201,505	$102,930	$565,027	$8,611,012	$567,154
.....	.....	.....	.....	.....	.....	.....	.....	.....	$81	$81	.....
.....	6	$9	.....	$2,169	$183	.....	.....	.....	209	6,351	$89
$459	931	1,543	$254	670,607	69,838	$3,533	$291	$531	942	751,309	35
1,913	63,817	64,928	35,546	1,540,192	191,452	46,523	14,922	22,774	214,683	2,996,860	33,685
96	704	622	701	108,057	10,024	1,422	.....	5	1,393	126,477	696
.....	.....	.....	.....	13,405	151	3,800	1,200	75	1,903	20,560	.....
.....	59	135	36	43,942	5,858	3,282	646	.....	4,414	107,629	483
.....	.....	.....	.....	7,200	873	.....	.....	.....	52	11,491	.....
.....	48	48	.....	2,661	.....	.....	.....	.....	12	2,721	669
.....	65	116	.....	13,721	223	886	.....	62	.....	15,008	.....
104	.....	.....	.....	23,920	5,391	421	99	156	2,019	44,878	11
.....	861	757	2,859	124,672	9,360	16,391	6,149	2,786	7,076	183,173	2,672
.....	.....	.....	.....	.....	.....	.....	67	.....	.....	67	.....
$2,372	66,491	$68,158	$39,396	$2,550,546	$293,353	$76,258	$23,374	$26,389	$232,784	$4,266,605	$38,340
$1,012,099	10,088,511	$9,738,390	¶$984,235	¶$43,899,502	¶$4,812,980	¶$3,331,789	$1,029,744	$1,890,957	$8,722,009	$85,436,897	¶$8,208,539

Boots and Shoes** Pairs.	Boots and Shoes** Value.	†Tires Automobile Value	†Tires All Others Value	Druggists' Rubber Sundries Value	All Other Manufactures of Rubber Value	Totals Value	Insulated Wire and Cables¶ Value
5,794,488	$4,551,386	.....	.....	$1,270,506	$9,097,773	$53,865,655	.....
1,285,110	1,584,747	.....	$1,557,227	772,539	5,762,079	31,501,292	.....
1,244,170	913,128	.....	1,130,623	‡884,245	6,194,816	33,343,181	.....
3,356,484	1,716,225	.....	2,547,652	.....	8,265,509	31,105,075	.....
1,976,896	1,046,102	.....	3,003,077	.....	7,290,345	35,153,374	.....
2,219,900	2,053,560	.....	576,602	.....	3,525,486	14,767,513	.....
1,634,258	834,289	.....	563,372	.....	3,453,472	12,441,220	.....
2,231,467	1,163,953	.....	611,458	.....	3,913,036	14,324,894	.....
2,545,076	$1,502,890	.....	$546,833	.....	$4,144,273	$12,822,978	.....
3,984,332	2,219,430	.....	592,470	.....	3,886,825	12,452,562	.....
3,791,084	1,984,739	.....	.....	.....	5,115,331	10,175,634	.....
2,396,425	1,292,673	.....	.....	.....	3,823,956	7,432,832	.....
3,080,253	1,614,290	.....	.....	.....	3,743,040	7,573,570	.....
2,310,420	1,231,898	.....	.....	.....	3,729,643	7,428,714	.....
2,693,690	1,505,082	.....	.....	.....	2,966,144	6,204,228	.....
2,390,539	1,214,342	.....	.....	.....	2,572,375	5,303,719	.....
2,310,420	1,231,898	.....	.....	.....	3,729,643	5,841,551	.....
2,307,401	1,056,491	.....	.....	.....	2,299,875	4,176,351	.....
2,594,708	1,046,315	.....	.....	.....	1,781,941	3,462,402	.....
1,459,100	724,015	.....	.....	.....	1,727,527	3,017,268	.....

specifically reported before 1917-18. §These figures are given for the calendar year ended December 31, 1918. ‖Ended June 30, 1918. ¶Not specifically

CABLE FROM THE UNITED STATES, CALENDAR YEAR 1920 (BY CUSTOMS DISTRICTS)

Boots Value	Shoes Pairs	Shoes Value	Soles and Heels¶ Value	Automobile Tires Casings¶ Value	Automobile Tires Inner Tubes¶ Value	Automobile Tires Solid Tires¶ Value	Automobile Tires All Others Value	Druggists' Rubber Sundries Value	All Other Manufactures of Rubber Value	Totals Value	Insulated Wire and Cables Value
.....	1,732	$1,022	.....	$1,905	.....	$690	$310	.....	.....	$23,271	.....
$35,751	2,943	3,644	$249	2,827	$2,665	1,829	610	$2,731	$15,757	79,183	$23,475
5,667	.....	.....	9,127	1,268,035	110,812	53,209	41,707	1,968	37,016	1,579,804	76,855
260,957	2,219,537	1,901,590	76,221	116,783	28,400	1,549	1,709	59,613	431,592	2,987,670	216,449
432,065	7,254,112	7,122,526	659,576	33,181,968	3,265,566	2,274,557	657,199	1,382,491	5,224,716	59,858,352	7,064,629
554	3,085	6,524	6,719	741,500	72,796	53,425	6,736	17,796	47,824	1,424,729	119,450
.....	2,814	4,283	310	29,812	7,568	2,644	829	.....	11,177	60,383	2,984
.....	.....	.....	.....	528	64	.....	80	.....	.....	672	.....
.....	.....	.....	.....	120	.....	.....	.....	.....	.....	120	.....
.....	.....	.....	106	349,890	34,467	365	307	938	34,475	428,015	.....
.....	9,205	10,564	29,870	782,634	108,965	154,463	19,611	1,341	12,847	1,141,762	38,428
.....	.....	.....	12	4,823	299	1,058	.....	.....	1,692	30,047	1,114
2,919	24,578	26,324	3,124	107,424	30,574	35	2,871	1,414	3,774	182,343	4,583
1,873	249,240	300,529	79,142	757,660	187,023	55,909	26,429	4,553	66,116	1,694,755	97,042
408	.....	.....	134	67,166	21,823	5,534	.....	518	5,751	163,495	6,581
372	8,414	8,205	808	87,379	12,426	4,908	410	2,965	16,698	239,392	31,255
108	63,958	59,440	1,268	36,024	6,499	2,214	1,080	5,679	17,470	243,539	42,368
840	34,725	36,785	14,222	697,744	108,993	45,109	15,558	26,763	129,252	1,371,449	74,922
2,079	1,226	5,746	.....	388	32	70	.....	.....	44	8,960	11
.....	125	250	.....	160	.....	.....	7	.....	103	6,054	.....
203	8,129	8,643	.....	7,525	11,141	19,036	193	4,996	7,684	62,281	2,853
375	.....	.....	.....	3,949	1,889	800	2,555	378	927	12,314	17
264	490	471	126	59,948	7,517	.....	199	651	584	75,347	4,132
47,899	51,502	59,522	71,206	2,783,566	300,584	245,564	91,790	48,948	251,508	5,169,590	89,094
22,256	8,165	8,854	12,328	549,342	53,433	34,595	22,412	6,142	32,008	959,288	8,978
16,389	23,539	40,545	6,275	1,087,903	307,624	275,821	112,420	125,960	927,697	3,646,321	66,806
27,791	53,550	44,923	8,582	470,993	20,252	40,451	7,833	33,554	141,781	870,977	77,644
3,320	2,186	7,097	.....	57,709	6,467	1,200	3,182	1,291	7,012	110,185	3,042
132,859	1,416	3,318	1,847	511,656	87,002	43,149	3,499	14,703	169,205	1,123,415	82,351
62	1	3	2,018	2,412	396	450	821	879	12,511	22,988	31
.....	.....	.....	.....	14,517	2,448	.....	1,557	.....	4,052	25,245	1,660
.....	.....	.....	.....	420	.....	.....	.....	.....	4	424	3,096
1,119	2,401	4,765	316	48,665	6,661	3,981	7,074	47,753	241,896	502,155	13,679
15,969	61,038	72,817	649	66,127	8,594	9,174	756	97,782	868,836	1,332,372	55,010
$1,012,099	10,088,511	$9,738,390	¶$984,235	$43,899,502	$4,812,980	$3,331,789	$1,029,744	$1,890,957	$8,722,009	$85,436,897	¶$8,208,539

Review of the Crude Rubber Market

NEW YORK

EARLY in the past month the rubber market was rather dull but steady with little factory demand and no large trading in evidence. Following Labor Day, marking the close of the summer vacation period, the market showed steady improvement with considerable buying of both spot and future plantation grades, due in part to replacement requirements owing to reported water damage sustained by 1,700 tons arriving by S. S. "City of Shanghai." Spot ribs sold at 13¾ to 14 cents. The three future positions of January, March and June, 1922, showed some activity, sales being made for January-March at 15 cents and for June at 16 cents.

Toward the close of the month ribs nearly equalled the price of crêpe, being quoted ¼-cent lower. Ambers were quoted at 13 to 13½ for No. 1 and one cent less for the lower grade. Increased buying, in fairly large quantities, by the factories for early spring delivery, and local buying here and in the Far East had firmed up Singapore prices which offered ribs at 9½ pence, exchange being firmer at $3.72¼.

The market continued firm and strong, spot ribs advancing from 13¾ to 16 cents, crêpe selling from ¼ to ½-cent higher. Sales of ribs for October-December delivery were made at 16½ cents, and January-March at 16¾ to 17 cents. That extremely low prices are no longer probable, at least for some time to come, is the belief of those forehanded consumers who, realizing that higher price levels are due, have begun buying for future needs.

The month's spot prices for the leading grades show the advancing tendency of the market. On September 3, first latex crêpe was 14½ cents, ribbed smoked sheets, 14 cents, and upriver fine, 18 cents. On September 26 spot first latex crêpe was 16 cents, ribbed smoked sheet 15¾ cents, and upriver fine, 21 cents.

Importations of all grades during August were 13,974 tons compared with 13,564 tons last year. Plantation arrivals for August were 13,031 tons, compared with 12,730 tons a year ago. Total imports of all grades for eight months ended August 31, 1921, were 104,378 tons, compared with 181,337 tons for the corresponding period in 1920.

Spot and future quotations on standard plantation and Brazilian grades were as follows:

PLANTATIONS. September 3. Spot, first latex crêpe, 14½ cents; October—December, 15 cents; January—March, 16 cents; January—June, 17 cents. September, 26. Spot, first latex crêpe, 16 cents; October—December, 16½ cents; January—March, 17 cents; January—June, 18 cents.

September 3. Spot, ribbed smoked sheets, 14 cents; October—December, 14½ cents; January—March, 15 cents; January—June, 16½ cents. September 26. Spot, ribbed smoked sheets, 15¾ cents; October—December, 16½ cents; January—March, 17 cents; January—June, 17½ cents.

September 3. Spot, No. 1 amber crêpe, 13¼ cents; October—December, 13¾ cents. September 26. Spot, No. 1 amber crêpe, 13½ cents; October—December, 14½ cents; January—March, 15 cents; January—June, 15½ cents.

September 3. Spot, No. 1 rolled brown crêpe, 11 cents; October—December, 11½ cents. September 26. Spot, No. 1 rolled brown crêpe, 12 cents; October—December, 12½ cents; January—March, 13 cents.

SOUTH AMERICAN PARÁS AND CAUCHO. September 3. Spot, upriver fine, 18 cents; islands fine, 17½ cents; upriver coarse, 9½ cents; islands coarse, 7 cents; Cametá, 8 cents; caucho ball, 10 cents. September 26. Spot, upriver fine, 21 cents; islands fine, 19 cents; upriver coarse, 11¼ cents; islands coarse, 8 cents; Cametá, 8 cents; caucho ball, 11¼ cents.

NEW YORK QUOTATIONS

Following are the New York spot quotations, for one year and one month ago, and September 26, the current date:

	October 1, 1920	September 1, 1921	September 26, 1921
PLANTATION HEVEA			
First, latex crêpe	$0.25 @.26	$0.14½ @	$0.16 @
Off latex crêpe	@	.13½ @	.15 @
Amber crêpe No. 1	.21 @.23	.12½ @	.13½ @.14
Amber crepe No. 2	.22 @	.11½ @	.12½ @.13
Amber crêpe No. 3	.21 @	.10½ @	.11½ @.12
Brown crêpe, thick and thin	.19 @.23	.11 @	.13 @.13½
Brown crêpe, specky	.20 @	.10½ @	.12 @
Brown crêpe, rolled	.17½ @.18	.10½ @	@
Smoked sheet, ribbed	.23¾ @.24½	.13¾ @	.15¾ @
Smoked sheet, plain	.22 @	.11½ @	.13½ @
Unsmoked sheet	.19 @	@	@
Colombo scrap No. 1	.15 @	@	@
Colombo scrap No. 2	.14 @	@	@
EAST INDIAN			
Assam crêpe	@	@	@
Assam onions	@	@	@
Penang block scrap	@	@	@
PONTIANAK			
Banjermassin	.10 @.11	.07½ @	.06 @.06½
Palembang	.10½ @.13	.07½ @	@
Pressed block	.18 @.21	.10 @.11	.11 @
Sarawak	.09 @	.06¾ @	.05½ @
SOUTH AMERICAN			
PARAS			
Upriver, fine	.25 @.26	.17¼ @	.21 @
Upriver, medium	.23 @.24	.14½ @	.17 @
Upriver, coarse	.16½ @.18	.09¼ @	.11 @
Upriver, weak, fine	.21 @.22	.13½ @	.18 @
Islands, fine	.25 @.26	.17 @	.19 @.20
Islands, medium	.23 @	.14 @	.14½ @
Islands, coarse	.15 @	.07 @	.08 @
Cametá	.15 @.15½	.08 @	.09 @.10
Acre Bolivian, fine	.28 @	.17½ @	.21 @.22
Madeira, fine	.29 @	.22 @	.24 @
Beni Bolivian	@	.17½ @	.21½ @.22
Peruvian, fine	.26 @	.17½ @	.18¾ @
Tapajos, fine	.23 @	.17 @	.19 @
CAUCHO			
Upper caucho ball	.19 @	@	.11 @
Lower caucho ball	.14 @	@	.10½ @
MANICOBAS			
Ceará negro heads	*.14 @	*.10 @	*.10 @
Ceará scrap	*.12 @	*.08 @	*.08 @
Maniçoba, 30% guaranty	*.15 @	*.10 @	*.10 @
Mangabeira thin sheet	*.18 @	.12 @	*.12 @
CENTRALS			
Corinto scrap	.17 @.18	.08 @.11	.08 @.10
Central scrap	.17 @.18	.08 @.11	.08 @.10
Central scrap and strip	.15 @.17	.07 @.09	.07 @.09
Central wet sheet	.13 @	.05 @	.04 @.05
Esmeralda sausage	.17 @.18	.08 @.11	.08 @.10
Guayule, 20% guaranty	.25 @	@	@
Guayule, washed and dried	.35 @	.25 @	.26 @
AFRICANS			
Benguela, No. 1, 28½%	.11 @.15	@	.04 @.04½
Benguela, No. 2, 32½%	@	.05 @	@
Conakry niggers	@	@	.06 @
Congo prime, black upper	@	@	@
Congo prime, red upper	@	@	@
Kassai, black	@	@	@
red	@	@	@
Massai sheets and strings	@	@	.16¾ @
Niger flake, prime	.18¾ @	@	.13 @.15
Rio Nunez* ball	@	@	@
Rio Nunez sheets, strings	@	@	@
GUTTA PERCHA			
Gutta Siak	.19 @.20	.15 @	.15 @
Red Macassar	3.80 @	2.50 @	2.50 @2.70
BALATA			
Block, Ciudad, Bolivar	.63 @	.53 @	.53 @.54
Colombia	.48 @	.39 @	.41 @.42
Panama	.35 @	.25 @	.41 @.42
Surinam sheet	.69 @	.64 @.65	.63 @.64
amber	.84 @	.68 @.69	.70 @.71

*Nominal.

RECLAIMED RUBBER

Standard reclaims have been reduced sharply in price this month, with the exception of those derived from mechanical goods and truck tires. Reclaiming plants generally are operating at about one-quarter capacity. In spite of this fact the outlook for an increased demand is considered promising. The upward turn in crude rubber prices if continued will constitute a helpful factor for increasing trade interest in reclaims.

The quotations below are nominal.

NEW YORK QUOTATIONS

September 26, 1921

Prices subject to change without notice.

STANDARD RECLAIMS

Floating	$0.12 @$0.13
Friction	.12 @ .13
Mechanical	.09 @ .11
Shoe	.10½@ .11
Tires, auto	.10½@ .11
truck	.09 @ .11
White	.13 @ .14

COMPARATIVE LOW AND HIGH NEW YORK SPOT RUBBER PRICES

	September 1921*	1920	1919
PLANTATIONS			
First latex crêpe	$0.14 @$0.16	$0.24½ @$0.29	$0.45½ @$0.52½
Smoked sheet, ribbed	.13¾ @ .15¾	.23½ @ .28¼	.44½ @ .51½
PARAS			
Upriver, fine	.17½ @ .21½	.26 @ .30	.54½ @ .56
Upriver, coarse	.09½ @ .11½	.16½ @ .21	.32 @ .33½
Islands, fine	.16½ @ .19	.24 @ .28	.47½ @ .48
Islands, coarse	.07 @ .09½	.15 @ .19	.21½ @ .22
Cametá	.07½ @ .09¼	.15 @ .17	.21½ @ .22

*Figured to September 26, 1921.

ANTWERP RUBBER MARKET

OSTERRIETH & CO., Antwerp, report under date of August 27, 1921:

Since our last report, no new features have characterized our market, and the tendency on the whole is rather one of stagnancy and inactivity, although we are convinced that it wants only a little bit of steadiness in prices to bring forth a good demand from consumers. We close the week as follows:

	Crêpes, Francs per Kilo	Sheets, Francs per Kilo
August, 1921	4.00	3.95
September	4.25	4.05
October	4.40	4.15
November	4.50	4.30
December	4.55	4.30
January, 1922	4.75	4.40
February	4.85	4.50
March	4.85	4.50
April	4.85	4.50
May	4.85	4.50
June	4.85	4.50
July	4.85	4.50

There is nothing to mention about Congo rubber, excepting some new arrivals per S. S. "Matadi," aggregating some 130 tons, which have not been put on the market yet. We quote today:

	Francs per Kilo
Prime red Kasai	3.25/3.40
Kasai Loanda II	1.75/2.50
Red thimbles	0.75

Usual Antwerp terms.

AMSTERDAM RUBBER MARKET

JOOSTEN & JANSSEN, Amsterdam, report under date of September 3, 1921:

The rubber market maintained this week its unanimated tendency, of which we already spoke in our previous report.

Originally prices improved a little, in connection with the higher London quotations, so that e. g., April-June sold at Fl. .56. Then prices receded again slightly with sellers of above-mentioned position at 55 and practically no buyers. On the spot some further old parcels changed hands at fair prices. Prices closed as follows:

Hevea crêpe, Fl. .46	Sheets, Fl. .44 spot.
Hevea crêpe, Fl. .49	Sheets, Fl. .47 Oct.—December.
Hevea crêpe, Fl. .52	Sheets, Fl. .50 Jan.—March.

HAMBURG RUBBER MARKET

Effektiv Rohgummimakler-Verein, Hamburg, report, under date of August 27, 1921:

No change in the situation was reported this week, inasmuch as fluctuating exchange prevented active business. Consumers were in the market with inquiries and orders, but owing to the demands of sellers, only a limited number of transactions took place.

The foreign markets report unchanged, steady prices, with quiet business. Pará grades for unloading are very firm, while locally goods have not yet followed this tendency.

Arrivals were normal, and quotations follow:

	Marks
First latex crêpe	25 @ 27
Ribbed smoked sheets	24 @ 26
Ribbed smoked sheets, lower grade	22 @ 23
Brown crêpe, clean	21.50@ 23
Brown crêpe, somewhat barky	19.50@ 21
Dark crêpe	.....
Hard fine Pará	36 @ 37.50
Caucho ball	18.50@ 19.50
Panama and Colombia block balata	65 @ 85
No. 1 balata sheet	120 @130
Jelutong	12 @ 17

SINGAPORE RUBBER MARKET

GUTHRIE & CO., Limited, Singapore, report under date of August 17, 1921:

Following reports of an easier tendency in other markets, the weekly auction opened this morning to a weaker market and a further decline in values has to be recorded. Standard quality pale crêpe sold for 28½ cents, and standard sheet brought 27 cents, a decline of 1 cent on both grades. Good pale crêpe was steady at last week's prices, while good F. A. Q. sheet was 1 cent weaker. Lower grade crêpes declined 1½ to 2 cents. Demand throughout was good at the lower level of values. Of 488 tons catalogd 311 tons were sold. The following is the course of values:

	In Singapore per pound	Sterling Equivalent per pound in London
Sheet, fine ribbed smoked	27 @	—/ 9⅛ @ —/ 9¼
Sheet, good ribbed smoked	19½ @ 26½	—/ 7¼ @ —/ 9¼
Crêpe, fine pale	28½ @	—/10⅛ @
Crêpe, good pale	20 @ 28	—/ 7⅛ @ —/10
Crêpe, fine brown	17 @ 21½	—/ 6⅞ @ —/ 8⅛
Crêpe, good brown	14 @ 16½	—/ 6 @ —/ 6¾
Crêpe, dark	14 @ 17	—/ 6 @ —/ 6⅞
Crêpe, bark	14 @ 15	—/ 6 @ —/ 6⅜

PLANTATION RUBBER EXPORTS FROM MALAYA

(These figures include the production of the Federated Malay States, but not of Ceylon)

	January 1 to June 30, 1921		January 1 to August 5,1921		
	Singapore	Malacca	Penang	Port Swettenham	Totals
To United Kingdom ...*pounds*	28,902,118	2,486,353	10,677,232	11,457,296	53,522,999
The Continent	5,818,722	1,739,485	107,866	124,092	7,790,165
Japan	20,905,337	.....	.....	37,575	20,942,912
Ceylon	44,627	.....	148,265	324,772	517,664
United States and Canada	61,541,410	15,640	1,335,133	.....	62,892,183
Australia	509,294	806	.....	.....	510,100
Other countries	15,680	.....	796,533	.....	812,213
Totals, *pounds*	117,737,188	4,242,284	13,065,029	11,943,735	146,988,236

Compiled by Barlow & Co., Singapore.

NEW YORK AVERAGE SPOT RUBBER PRICES

Prices in Cents per Pound

	August, 1921															September, 1921								
	15	16	17	18	19	20	22	23	24	25	26	27	29	30	31	1	2	3*	5†	6	7	8	9	10
PLANTATIONS																								
Sheet																								
Ribbed smoked	13¾	13¾	13½	13¼	13¾	13¼	14	14	14	13⅞	13⅝	13⅝	13½	13⅝	13¾	14	14	....	....	14	14¼	14⅛	14⅛	14⅛
Crêpe																								
First latex	14¾	14⅝	14¼	14	14	14	14⅛	14⅛	14⅛	14	13⅝	13⅝	13½	13¾	14⅛	14¼	14¼	....	....	14⅛	14¼	14⅛	14¼	14⅛
Off latex	13¾	13½	13¼	13	13¼	13¼	13¼	13¼	13¼	13⅜	13	13	12¾	13⅛	13½	13⅝	13¼	....	....	13½	13¾	13½	13½	13½
No. 1 blanket	12¾	12⅝	12⅝	12½	12⅝	12¾	12¾	12¾	12¾	12¾	12⅝	12⅝	12¾	12¾	12⅝	12½	12½	....	....	12¾	12¾	12⅝	12¾	12¾
No. 2 blanket	11¾	11¾	11¾	11¾	11¾	11¾	11¾	11¾	11¾	11¾	11⅝	11⅝	11½	11¾	12	11¾	11⅜	....	....	11¾	11¾	11¾	11¾	11¾
No. 3 blanket	10¼	10¼	10¼	10¼	10¼	10¼	10¼	10¼	10¼	10¼	10⅝	10⅝	10¾	10¾	11½	10⅞	11	....	....	10¾	10⅞	10¾	10¾	10½
Thin,clean,brown	11¾	11½	11¾	11	11¾	11¾	11¾	11¾	11¾	11½	11¼	11¼	11⅜	11¾	11½	11⅝	11⅜	....	....	11⅞	11¾	11¾	11¾	11¾
Specky brown	10¼	10½	10¾	10½	10¾	10¾	10¾	10½	10¾	10½	10	10	10½	10⅝	10⅝	10¾	10⅝	....	....	11	10⅞	10¾	10¾	10¾
Rolled brown	10¼	10¼	10⅜	10¼	10¼	10¼	10¼	10¼	10¼	10¼	10¼	10¼	10¼	10¼	10¼	11	11	....	....	11	11	10¾	10¾	10¾

*Trade closed. †Holiday.

LONDON AND LIVERPOOL CRUDE RUBBER IMPORTS AND EXPORTS

1921		Week Ended Aug. 13	Aug. 20	Aug. 27	Sept. 3
Imports—London:					
Ceylon	tons	442	218	298	217
British North Borneo		2	11	25	40
Straits		484	699	528	1,198
British India		63	2	43	81
Dutch East Indies		....	289	43	116
Fiji Islands		2	....	....	....
Java		65	....	10	78
New South Wales		5	....	....	....
Nyasaland		....	....	12	....
Total	tons	1,063	1,219	959	1,730
Exports—London:					
France	tons	219	249	173	258
Belgium		35	8	17	5
Germany		461	81	133	160
Holland		230	216	30	119
New Zealand		1	....	....	....
Italy		30	....	27	10
Spain		....	1	....	1
New York		599	447	675	1,067
Sweden		....	....	....	12
Canada		....	....	1	20
Total	tons	1,575*	1,002	1,056	1,652
Imports—Liverpool:					
Ceylon	tons	....	....	15	40
Straits		....	....	3	210
Dutch East Indies		....	....	....	10
Brazil		139	....	75	....
Total	tons	139†	....	93	260
Exports—Liverpool		....	....	....	....

*Week ended August 15, 1921.
†Cases.

CEYLON RUBBER EXPORTS

		January 1, to July 27 1920	1921
To United Kingdom	pounds	21,781,907	18,338,931
Austria		.....	980
Belgium		106,830	249,904
France		440,817	317,900
Germany		126,165	2,040,018
Holland		28	374,281
Denmark		.....	51,610
Italy		112,000	95,200
Norway		.....	2,240
Western Australia		56	.....
Victoria		179,269	127,390
New South Wales		266,894	103,800
United States		24,931,410	25,392,760
Canada and Newfoundland		425,600	419,148
India		586	8,632
Straits Settlements		44,800	.....
Japan		157,667	211,856
Totals	pounds	48,574,029	47,734,650

Compiled by the Ceylon Chamber of Commerce.

FEDERATED MALAY STATES RUBBER EXPORTS

An official report from Kuala Lumpur states that 5,554 tons of cultivated rubber were exported in the month of July from the Federated Malay States, as against 5,823 tons in June and 8,043 tons in the corresponding month last year. The total export for seven months amounts to 47,063 tons, compared with 63,518 tons last year and 59,357 tons in 1919. Appended are the comparative statistics:

		1919	1920	1921
January	tons	7,163	11,119	7,085
February		10,809	9,781	6,091
March		10,679	9,524	7,408
April		7,664	8,375	7,444
May		7,308	7,627	7,658
June		7,094	9,049	5,823
July		8,640	8,043	5,554
Totals	tons	59,357	63,518	47,063

STRAITS SETTLEMENTS RUBBER EXPORTS

An official report from Singapore states that the exports of plantation rubber from Straits Settlements ports for the month of July amounted to 10,598 tons (transhipments, 1,579 tons), as against 10,111 tons in June and 10,773 tons in the corresponding month last year. The total exports for seven months amounted to 54,510 tons, compared with 84,256 tons in 1920 and 90,543 tons in 1919. Appended are the comparative statistics:

		1919	1920	1921
January	tons	14,404	13,125	5,809
February		15,661	17,379	5,813
March		20,908	5,931	7,275
April		10,848	9,768	6,091
May		15,845	15,617	8,813
June		5,059	11,663	10,111
July		7,818	10,773	10,598
Totals	tons	90,543	84,256	54,510

These figures include transhipments of rubber from various places in the neighborhood of the Straits Settlements, such as Borneo, Java, Sumatra and the non-Federated Malay States, as well as rubber actually exported from the Colony, but *do not* include rubber exports from the Federated Malay States.

PLANTATION RUBBER EXPORTS FROM JAVA*

		June 1920	June 1921	Six Months Ended June 1920	Six Months Ended June 1921
To Netherlands	kilos	366,000	405,000	2,212,000	4,133,000
Great Britain		1,059,000	1,061,000	3,790,000	5,326,000
Germany		.....	11,000		156,000
Belgium		.....	.....	†49,000	5,000
Italy		.....	14,000		18,000
United States		1,085,000	500,000	8,126,000	3,008,000
Singapore		417,000	181,000	2,282,000	1,238,000
Japan		.....	.....	184,000	95,000
Australia		3,000	.....	49,000	1,043,000
Totals	kilos	2,930,000	2,172,000	16,692,000	14,822,000
Ports of origin:					
Tandjong Priok	kilos	1,273,000	801,000	7,918,000	7,587,000
Samarang		52,000	61,000	246,000	222,000
Soerabaya		1,551,000	1,022,000	8,068,000	5,824,000

*The May figures are verified.
†Destinations not separately mentioned.

CRUDE RUBBER ARRIVALS AT ATLANTIC PORTS AS STATED BY SHIPS' MANIFESTS

PARAS AND CAUCHO AT NEW YORK

	Fine	Medium	Coarse	Caucho	Totals Pounds
AUGUST 12. By the S. S. "Sallust" from Pará.					
Paul Bertuch	23,280	4,870	.....	.....	28,150
Poel & Kelly, Inc.	22,155	.....	.....	22,025	44,180
AUGUST 18. By the S. S. "Balzac" from Manáos.					
Poel & Kelly, Inc.	33,902	.....	.....	.....	33,902
AUGUST 18. By the S. S. "Balzac" from Pará.					
Paul Bertuch	.....	.....	5,090	.....	5,090
Poel & Kelly, Inc.	2,701	.....	.....	110,897	113,598
AUGUST 20. By the S. S. "Hubert" from Manáos.					
Paul Bertuch	23,280	.....	.....	92,770	116,050
Poel & Kelly, Inc.	17,318	.....	.....	.....	17,318
AUGUST 29. By the S. S. "Hubert" from Pará.					
H. A. Astlett & Co.	76,000	5,000	.....	.....	81,000
Meyer & Brown, Inc.	44,800	.....	.....	.....	†44,800
SEPTEMPER 19. By the S. S. "Polycarp" from Manáos.					
Poel & Kelly, Inc.	960	210	.....	.....	1,170
SEPTEMBER 20. By the S. S. "Virgil" from Manáos.					
Poel & Kelly, Inc.	1,000	.....	58,600	.....	59,600

†Includes medium.

PLANTATIONS

(Figured at 180 pounds net to the bale or case.)

	Shipment from:	Shipped to:	Pounds.	Totals.
AUGUST 10. By the S. S. "Osakis" at New York.				
Jaeger & Co.	Singapore	New York	72,000	
Chas. T. Wilson Co., Inc.	Singapore	New York	28,800	
L. Littlejohn & Co., Inc.	Singapore	New York	22,400	
Poel & Kelly, Inc.	Singapore	New York	81,924	
Various	Singapore	New York	83,536	

UNITED STATES CRUDE AND WASTE RUBBER IMPORTS FOR 1921 (BY MONTHS)

1921		Plantation	Parás	Africans	Centrals	Guayule	Manicoba and Matto Grosso	Balata	Miscellaneous	Waste	Totals 1921	Totals 1920
January	tons	12,819	1,312	43	3	.....	.....	41	173	1,071	15,462	22,401
February		7,913	432	269	2	25	.....	25	216	37	8,919	33,984
March		12,241	1,794	377	1	.....	3	29	7	345	14,797	33,998
April		16,861	403	.....	5	.....	.....	64	226	7	17,566	24,957
May		9,127	1,570	.....	2	33	.....	40	186	41	10,999	28,666
June		12,361	1,091	.....	25	.....	.....	49	203	72	13,801	15,606
July		11,140	495	27	30	.....	.....	25	189	34	11,940	17,487
August		13,031	899	41	3	.....	.....	21	102	22	14,119	15,066
Totals, 8 months, 1921		95,493	7,996	757	71	58	3	294	1,302	1,629	107,603	.....
Totals, 8 months, 1920		161,828	14,514	3,657	665	660	13	394	7,072	3,362	.....	192,165

Compiled by The Rubber Association of America, Inc.

PLANTATIONS—Continued

	Shipment from:	Shipped to:	Pounds.	Totals.
Netherlands Corporation for Overseas Trade...	Batavia	New York	115,380	
Various	Batavia	New York	29,340	433,380
AUGUST 11. By the S. S. "Alaskan" at New York.				
Various	Far East	New York	36,000	36,000
AUGUST 12. By the S. S. "Verentia" at New York.				
Various	London	New York	2,880	2,880
AUGUST 13. By the S. S. "Albania" at New York.				
J. T. Johnstone & Co., Inc.	Liverpool	New York	74,539	74,539
AUGUST 14. By the S. S. "Noordam" at New York.				
L. Littlejohn & Co., Inc.	Java	New York	56,000	
J. T. Johnstone & Co., Inc.	London	New York	14,689	
Poel & Kelly, Inc.....	Rotterdam	New York	89,263	
Various	Rotterdam	New York	134,656	294,608
AUGUST 14. By the S. S. "Bowes Castle" at New York.				
General Rubber Co.....	Singapore	New York	669,780	
Firestone Tire & Rubber Co.	Singapore	Akron	323,220	
Poel & Kelly, Inc.....	Singapore	New York	247,864	
Chas. T. Wilson Co., Inc.	Singapore	New York	54,360	
H. Muehlstein & Co....	Singapore	New York	45,000	
Peninsular Trading Agency, Inc.	Singapore	New York	54,360	
Raw Products Co.....	Singapore	New York	27,000	
L. Littlejohn & Co., Inc.	Singapore	New York	817,600	
J. T. Johnstone & Co., Inc.	Singapore	New York	56,000	
Thomas A. Desmond & Co.	Singapore	New York	70,560	
John D. Lewis.....	Singapore	New York	80,820	
William H. Stiles & Co.	Singapore	New York	55,980	
Phelan, Borland & Fearons	Singapore	New York	133,740	
Baird Rubber & Trading Co.	Singapore	New York	29,700	
The Fisk Rubber Co....	Singapore	Chicopee Falls	66,080	
Various	Singapore	New York	1,166,386	
Various	Malacca	New York	359,640	4,258,090
AUGUST 14. By the S. S. "Bellhaven" at New York.				
Various	Rotterdam	New York	41,400	41,400
AUGUST 18. By the S. S. "Abron" at New York.				
Netherlands Corporation for Overseas Trade...	Batavia	New York	2,160	
F. R. Henderson & Co..	Batavia	New York	15,660	
Various	Batavia	New York	40,860	58,680
AUGUST 19. By the S. S. "West Neris" at New York.				
Eastern Rubber Co.....	Singapore	Baltimore	94,140	
Poel & Kelly, Inc.....	Singapore	New York	48,600	
Firestone Tire & Rubber Co.	Singapore	Akron	212,940	
Various	Singapore	New York	72,880	
Various	Colombo	Baltimore	116,810	545,370
AUGUST 22. By the S. S. "Westerdyk" at New York.				
Poel & Kelly, Inc.....	Rotterdam	New York	44,121	
L. Littlejohn & Co., Inc.	Java	New York	313,600	
The Goodyear Tire & Rubber Co.	Rotterdam	Akron	32,400	
Meyer & Brown, Inc....	Rotterdam	New York	56,000	
Various	Rotterdam	New York	477,099	923,220
AUGUST 22. By the S. S. "Melford Hall" at New York.				
Goldman, Sachs & Co...	Colombo	New York	57,960	
L. Littlejohn & Co., Inc.	Colombo	New York	672,000	
H. A. Astlett & Co.....	Colombo	New York	25,000	
Various	Colombo	New York	56,480	811,440
AUGUST 24. By the S. S. "F. J. Luckenbach" at New York.				
Poel & Kelly, Inc.....	Singapore	New York	242,878	
Various	Rotterdam	New York	67,082	309,960
AUGUST 25. By the S. S. "City of Shanghai" at New York.				
Rubber Importers' & Dealers' Co., Inc.....	Singapore	New York	147,420	
Pacific Trading Corporation of America.....	Singapore	New York	198,000	
J. T. Johnstone & Co., Inc.	Singapore	New York	44,800	
Poel & Kelly, Inc.....	Singapore	New York	407,181	
Raw Products Co.....	Singapore	New York	77,760	
Baird Rubber & Trading Co.	Singapore	New York	50,220	
H. Muehlstein & Co....	Singapore	New York	27,000	
L. Littlejohn & Co., Inc.	Singapore	New York	1,243,200	
Chas. T. Wilson Co., Inc.	Singapore	New York	25,200	
Thomas A. Desmond & Co.	Singapore	New York	219,600	
F. R. Henderson & Co..	Singapore	New York	37,800	
William H. Stiles & Co.	Singapore	New York	9,900	
Baring Bros.....	Singapore	New York	48,060	
Alden's Successors, Inc.	Singapore	New York	56,520	
Phelan, Borland & Fearons	Singapore	New York	134,100	
Ajax Rubber Co., Inc...	Singapore	New York	8,460	
Jaeger & Co.....	Singapore	New York	67,320	
Smith & Schippers', Inc.	Singapore	New York	100,800	
General Rubber Co.....	Singapore	New York	1,447,920	
H. A. Astlett & Co.....	Singapore	New York	360,000	
The Fisk Rubber Co....	Singapore	Chicopee Falls	127,768	
Meyer & Brown, Inc...	Singapore	New York	112,000	
Fred Stern & Co.....	Singapore	New York	56,000	
Various	Singapore	New York	369,751	
Various	Telokanson	New York	29,340	
Various	P't Sw't'nh'm	New York	50,220	
Firestone Tire & Rubber Co.	Belawan Deli	Akron	200,520	
Hood Rubber Co.....	Belawan Deli	Watertown	93,600	
Various	Belawan Deli	New York	115,720	
Various	Malacca	New York	754,740	6,620,920
AUGUST 26. By the S. S. "Rotterdam" at New York.				
H. A. Astlett & Co.....	Rotterdam	New York	115,000	
L. Littlejohn & Co., Inc.	Rotterdam	New York	504,000	
Meyer & Brown, Inc....	Rotterdam	New York	22,400	
Various	Rotterdam	New York	922,980	1,564,380
AUGUST 29. By the S. S. "Tosa Maru" at New York.				
The B. F. Goodrich Co.	Colombo	Akron	352,920	
L. Littlejohn & Co., Inc.	Colombo	New York	114,200	
Poel & Kelly, Inc.....	Singapore	New York	58,623	
Meyer & Brown, Inc...	Colombo	New York	548,800	
Various	Colombo	New York	9,597	1,084,140
AUGUST 31. By the S. S. "Samarinda" at New York.				
Various	Belawan	New York	964,693	
Manhattan Rubber Manufacturing Co.....	Batavia	New York	37,440	
Meyer & Brown, Inc....	Batavia	New York	112,000	
L. Littlejohn & Co., Inc.	Singapore	New York	134,400	
Various	Soerabaya	New York	234,788	1,483,321
SEPTEMBER 1. By the S. S. "Kumeric" at New York.				
J. Aron & Co.....	Colombo	New York	20,160	
Chas. T. Wilson Co., Inc.	Colombo	New York	79,560	
Whittall & Co. of Ceylon.	Colombo	New York	211,140	
L. Littlejohn & Co., Inc.	Colombo	New York	537,600	
H. A. Astlett & Co.....	Colombo	New York	56,000	
Paul Bertuch	Colombo	New York	33,600	
Various	Colombo	New York	139,060	1,077,120
SEPTEMBER 3. By the S. S. "Ryndam" at New York.				
Poel & Kelly, Inc.....	Rotterdam	New York	45,158	
The Goodyear Tire & Rubber Co.	Rotterdam	Akron	482,580	
L. Littlejohn & Co., Inc.	Rotterdam	New York	582,400	
Various	Rotterdam	New York	119,442	1,229,580
SEPTEMBER 6. By the S. S. "Hague Maru" at New York.				
Poel & Kelly, Inc.....	Singapore	New York	370,000	
L. Littlejohn & Co., Inc.	Singapore	New York	214,200	
Baird Rubber & Trading Co.	Singapore	New York	13,500	
William H. Stiles & Co.	Singapore	New York	12,600	
Raw Products Co.....	Singapore	New York	45,000	
Eastern Rubber Co.....	Singapore	New York	30,060	
Various	Singapore	New York	322,100	1,007,460
SEPTEMBER 6. By the S. S. "Edgar F. Luckenbach" at New York.				
Fred Stern & Co.....	London	New York	117,900	
Various	London	New York	469,080	586,980
SEPTEMBER 6. By the S. S. "Deucalion" at New York.				
F. R. Henderson & Co..	Singapore	New York	45,000	
L. Littlejohn & Co., Inc.	Singapore	New York	1,400,000	
J. T. Johnstone & Co...	Singapore	New York	253,740	
Goldman, Sachs & Co...	Singapore	New York	89,640	
H. Muehlstein & Co....	Singapore	New York	234,180	
Habicht & Co.....	Singapore	New York	26,280	
Chas. T. Wilson Co., Inc.	Singapore	New York	25,200	
Edward Boustead & Co.	Singapore	New York	919,800	
East Asiatic Co., Inc...	Singapore	New York	99,720	
John D. Lewis.....	Singapore	New York	90,000	
Pell & Dumont, Inc....	Singapore	New York	37,800	
Poel & Kelly, Inc.....	Singapore	New York	56,000	
E. G. Curry & Co., Inc.	Singapore	New York	34,560	
C. B. Kaufman.....	Singapore	New York	194,400	
General Rubber Co.....	Singapore	New York	626,220	
Continental Rubber Co. of New York.....	Singapore	New York	56,000	
Meyer & Brown, Inc....	Singapore	New York	1,030,400	
Firestone Tire & Rubber Co.	Singapore	Akron	190,080	
Hood Rubber Co.....	Singapore	Watertown	54,000	
H. A. Astlett & Co.....	Singapore	New York	65,000	
Fred Stern & Co.....	Singapore	New York	67,200	
Edward Boustead & Co..	Penang	New York	30,240	
J. T. Johnstone & Co...	Malacca	New York	155,700	
Various	Malacca	New York	86,760	
Various	Singapore	New York	47,060	
Various	Belawan Deli	New York	341,280	
Various	Telok Neboeng	New York	80,640	
Various	P't Sw't'nh'm	New York	252,000	
Various	Colombo	New York	954,360	7,543,260
SEPTEMBER 6. By the S. S. "Wolverine State" at San Francisco.				
Fred Stern & Co.....	Singapore	Los Angeles	22,400	22,400
SEPTEMBER 9. By the S. S. "City of Madras" at New York.				
General Rubber Co.....	Singapore	New York	632,160	
Meyer & Brown, Inc....	Singapore	New York	96,320	
Hood Rubber Co.....	Singapore	Watertown	79,200	
Erpf & Co., Inc.....	Singapore	New York	51,660	
Chas. T. Wilson Co., Inc.	Singapore	New York	216,540	
L. Littlejohn & Co., Inc.	Singapore	New York	1,034,000	
Lee Tire & Rubber Co. of New York.....	Singapore	New York	43,560	
Poel & Kelly, Inc.....	Singapore	New York	290,467	
Jaeger & Co.....	Singapore	New York	185,040	
Wm. Brandt's Sons & Co.	Singapore	New York	231,840	
J. T. Johnstone & Co...	Singapore	New York	81,310	
H. Muehlstein & Co.....	Singapore	New York	9,000	
Baird Rubber & Trading Co.	Singapore	New York	99,000	
William H. Stiles & Co.	Singapore	New York	316,800	
Ajax Rubber Co., Inc...	Singapore	New York	38,340	
American Trading Co...	Singapore	New York	153,540	

PLANTATIONS—Continued

	Shipment from:	Shipped to:	Pounds.	Totals.
F. R. Henderson & Co..	Singapore	New York	45,000	
Edward Boustead & Co..	Singapore	New York	49,860	
Habicht & Co.....	Singapore	New York	63,540	
Fred Stern & Co.....	Singapore	New York	26,868	
Rubber Importers & Dealers Co., Inc.....	Singapore	New York	273,600	
Pell & Dumont, Inc....	Singapore	New York	27,000	
Fred Waterhouse Co....	Singapore	New York	2,880	
Continental Rubber Co. of New York.....	Singapore	New York	67,200	
Pacific Trading Corporation of America.....	Singapore	New York	40,320	
Baring Bros.....	Singapore	New York	12,060	
H. A. Astlett & Co.....	Singapore	New York	112,000	
Various	Singapore	New York	825,135	
Eastern Rubber Co.....	Belawan Deli	New York	45,180	
Firestone Tire & Rubber Co.	Belawan Deli	Akron	151,200	
Various	Belawan Deli	New York	31,320	5,531,940
SEPTEMBER 9. By the S. S. "Nieuw Amsterdam" at New York.				
Rubber Importers & Dealers Co., Inc.....	Rotterdam	New York	369,960	
L. Littlejohn & Co., Inc.	Rotterdam	New York	692,100	
Meyer & Brown, Inc....	Rotterdam	New York	112,000	
Fred Stern & Co.....	London	New York	22,400	1,196,460
SEPTEMBER 11. By the S. S. "Malacca Maru" at New York.				
H. A. Astlett & Co.....	Colombo	New York	30,000	
L. Littlejohn & Co., Inc.	Colombo	New York	475,920	
Baring Bros.....	Colombo	New York	126,000	
General Rubber Co.....	Colombo	New York	151,200	
Meyer & Brown, Inc....	Colombo	New York	134,400	
Poel & Kelly, Inc.....	Singapore	New York	100,800	
H. Muehlstein & Co....	Colombo	New York	31,320	
Goldman, Sachs & Co...	Colombo	New York	55,440	
Fred Stern & Co.....	Colombo	New York	22,400	
Various	Colombo	New York	168,160	1,295,640
SEPTEMBER 15. By the S. S. "Loretto" at New York.				
Firestone Tire & Rubber Co.	Singapore	New York	252,000	
L. Littlejohn & Co., Inc...	Java	New York	638,800	
The Goodyear Tire & Rubber Co.....	Colombo	Akron	264,960	
E. G. Curry & Co., Inc.	Colombo	New York	11,880	
Chas. T. Wilson Co., Inc.	Colombo	New York	30,240	
Poel & Kelly, Inc.....	Singapore	New York	112,000	
Baring Bros.....	Colombo	New York	153,000	
Baird Rubber & Trading Co.	Colombo	New York	139,140	
C. B. Kaufman.....	Colombo	New York	54,000	
H. Muehlstein & Co....	Colombo	New York	50,400	
F. R. Henderson & Co..	Colombo	New York	46,800	
Various	Colombo	New York	187,560	
H. A. Astlett & Co.....	Batavia	New York	25,000	1,965,780
SEPTEMBER 15. By the S. S. "Editor" at New York.				
Fred Stern & Co.....	London	New York	112,000	
Meyer & Brown, Inc....	London	New York	22,400	
The Goodyear Tire & Rubber Co.....	Rotterdam	Akron	73,800	
A. C. Spencer Hess.....	Rotterdam	New York	27,360	
Various	Rotterdam	New York	280,860	516,420
SEPTEMBER 16. By the S. S. "Albania" at New York.				
J. T. Johnstone & Co.....	Liverpool	New York	35,097	35,097
SEPTEMBER 17. By the S. S. "Noordam" at New York.				
Various	Rotterdam	New York	1,488,420	1,488,420
SEPTEMBER 17. By the S. S. "Banka" at New York.				
Various	Belawan	New York	557,526	
L. Littlejohn & Co., Inc...	Batavia	New York	444,813	
Irwin-Harrisons Crosfield, Inc.	Batavia	New York	12,960	
Various	Batavia	New York	9,360	
Poel & Kelly, Inc.....	Singapore	New York	112,000	1,136,659
SEPTEMBER 18. By the S. S. "New Britain" at New York.				
Meyer & Brown, Inc....	London	New York	56,000	
East Asiatic Co., Inc....	Rotterdam	New York	289,440	
Poel & Kelly, Inc.....	Singapore	New York	223,321	568,761
SEPTEMBER 19. By the S. S. "Pak Ling" at New York.				
R. Davies.....	Soerabaya	New York	9,180	
Frank Hall & Co.....	Soerabaya	New York	25,200	
Various	Soerabaya	New York	166,100	
Fred Stern & Co.....	Singapore	New York	11,200	211,680

PONTIANAK

AUGUST 25. By the S. S. "City of Shanghai" at New York.				
Pacific Trading Corporation of America.....	Singapore	New York	4,500	
L. Littlejohn & Co., Inc.	Singapore	New York	103,500	108,000
SEPTEMBER 6. By the S. S. "Deucalion" at New York.				
Various	Singapore	New York	57,600	57,600
SEPTEMBER 9. By the S. S. "City of Madras" at New York.				
Various	Singapore	New York	112,800	112,800

CENTRALS

AUGUST 23. By the S. S. "Alliance" at New York.				
Pablo Calvet & Co.....	Colombian P'ts	New York	9,180	9,180

AFRICANS

AUGUST 18. By the S. S. "Suwied" at New York.				
Philip C. Stowe.....	Lisbon	New York	37,260	37,260
AUGUST 30. By the S. S. "Scythia" at New York.				
Poel & Kelly, Inc.....	Liverpool	New York	45,578	45,578
SEPTEMBER 17. By the S. S. "Lapland" at New York.				
Various	Antwerp	New York	11,960	11,960

GUTTA PERCHA

	Shipment from:	Shipped to:	Pounds.	Totals.
AUGUST 14. By the S. S. "Bowes Castle" at New York.				
L. Littlejohn & Co., Inc.	Singapore	New York	63,000	63,000
SEPTEMBER 3. By the S. S. "Carmania" at New York.				
Various	Liverpool	New York	11,400	11,400
SEPTEMBER 9. By the S. S. "City of Madras" at New York.				
L. Littlejohn & Co., Inc.	Singapore	New York	205,800	205,800

GUTTA SIAK

AUGUST 14. By the S. S. "Bowes Castle" at New York.				
Various	Singapore	New York	120,000	120,000
AUGUST 25. By the S. S. "City of Shanghai" at New York.				
Baird Rubber & Trading Co.	Singapore	New York	41,700	41,700
SEPTEMBER 6. By the S. S. "Deucalion" at New York.				
Various	Singapore	New York	60,000	60,000

BALATA

AUGUST 23. By the S. S. "Matura" at New York.				
Middleton & Co., Limited	Surinam	New York	26,113	
Middleton & Co., Limited	French Guiana	New York	4,490	30,603
AUGUST 23. By the S. S. "Anna" at New York.				
P. R. Rincones, Jr., Co.	Puerto Colombia	New York	7,500	7,500
AUGUST 29. By the S. S. "Hubert" at New York.				
Various	Pará	New York	750	750
AUGUST 29. By the S. S. "Lake Fackler" at New York.				
Middleton & Co., Limited	Surinam	New York	3,715	
Middleton & Co., Limited	French Guiana	New York	19,059	22,774
SEPTEMBER 3. By the S. S. "Lake Fariston" at New York.				
Middleton & Co., Limited	Surinam	New York	11,807	11,807
SEPTEMBER 3. By the S. S. "Ryndam" at New York.				
Various	Rotterdam	New York	2,550	2,550
SEPTEMBER 6. By the S. S. "Mayaro" at New York.				
Middleton & Co., Limited	Cristobal	New York	3,000	
American Trading Co...	Cristobal	New York	450	3,450
SEPTEMBER 7. By the S. S. "Prince de Nederland" at New York.				
William Schall & Co....	Caracas	New York	11,700	11,700

ANTWERP RUBBER ARRIVALS

AUGUST 17. By the S. S. *Matadi*, from the Congo.

Société Anonyme Bungé (Compagnie du Congo belge).....*kilos*	52,990
Société Anonyme Bungé (Forminière).....	5,200
Société Anonyme Bungé (Intertropical-Comfina).....	32,368
Société Anonyme Bungé (Comptoir Colonial Belgika).....	3,420
Société Anonyme Bunge.....	30,537
Messieurs Osterrieth & Co.....	1,100
Société Coloniale Anversoise (S. A. B.).....	600
Various	8,170
Total	134,385

Compiled by Grisar & Co., Antwerp.

CUSTOM HOUSE STATISTICS

NEW YORK

IMPORTS

	July 1920 Pounds	July 1920 Value	July 1921 Pounds	July 1921 Value
UNMANUFACTURED—*free*				
Crude rubber				
From Belgium	.....	.....	64,052	$1,268
France	197,165	$67,798	11,356	2,019
Netherlands	692,369	280,188	323,106	40,365
Portugal	509,146	169,974	31,717	5,843
Turkey in Europe..	3,440	927	.....	.....
England	3,369,347	1,471,548	3,347,596	415,510
Costa Rica	3,280	878	.....	.....
Nicaragua	15,680	4,341	.....	.....
Panama	9,504	2,699	11,400	1,164
Salvador	3,335	911	.....	.....
Mexico	12,370	3,570	.....	.....
Bolivia	27,539	11,252	.....	.....
Brazil	3,529,968	920,488	1,482,037	116,275
Colombia	86,983	27,689	10,270	1,635
Ecuador	18,337	5,301	.....	.....
Peru	635,693	220,873	78,582	11,318
Uruguay	24,116	5,300	.....	.....
Venezuela	79,751	24,149	.....	.....
China	37,660	21,176	56,000	7,000
British India	134,830	44,989	151,200	36,192
Straits Settlements..	20,498,110	9,809,130	17,772,105	2,923,879
British East Indies..	2,844,299	1,174,374	1,472,757	173,456
Dutch East Indies...	9,834,653	4,474,469	1,976,089	340,946
Japan	33,600	13,555	.....	.....
Philippine Islands...	17,046	5,500	23,540	3,000
South Africa	2,738	685	.....	.....
Egypt	17,940	6,997	.....	.....
Totals	42,638,299	$18,768,761	26,811,807	$4,079,870
Balata	43,293	25,590	139,508	89,302
Jelutong (Pontianak)	1,525,057	245,844	4,263	449
Gutta percha	844,952	190,108	114,871	23,419
Totals	45,051,601	$19,230,303	27,070,449	$4,193,040
Rubber scrap and reclaimed.	1,014,970	103,663	69,904	1,318
Totals, unmanufactured	46,066,571	$19,333,966	27,140,353	$4,194,358
Manufactures of rubber and gutta percha .....*dutiable*	.....	$141,898	.....	$53,951
Chicle .....*dutiable*	748,815	535,289	214,081	96,272

EXPORTS

MANUFACTURED	July 1920 Pounds	July 1920 Value	July 1921 Pounds	July 1921 Value
Automobile and other tires	.....	$2,766,891	.....	$822,820
Inner tubes	.....	228,208	.....	65,519
Belting, hose, and packing	.....	326,459	.....	170,632
Rubber boots and shoes, *pairs*	340,240	370,261	154,269	182,091
Soles and heels	.....	45,382	.....	27,787
Druggists' sundries	.....	134,316	.....	27,518
Other rubber manufactures	.....	320,321	.....	187,440
Totals, manufactured	.....	$4,191,838	.....	$1,483,807
Insulated wire	.....	$480,514	.....	$478,384
UNMANUFACTURED—*free*				
Rubber scrap and reclaimed	247,381	$25,620	316,284	$20,723

FOREIGN EXPORTS

Crude rubber	35,700	$22,600	33,900	$1,690
Balata	27,700	15,675	2,200	704
Guayule	1,666	1,083	.....	.....
Rubber scrap and reclaimed	1,875	169	.....	.....
Rubber manufactures	.....	225	.....	490
Chicle	11,020	1,112	.....	.....

MASSACHUSETTS

IMPORTS

UNMANUFACTURED—*free*				
Crude rubber				
From England	28,547	$9,577	.....	.....
British East Indies	48,440	13,994	.....	.....
Totals	76,987	$23,571	.....	.....
Rubber scrap and reclaimed	.....	.....	9,000	$360
Totals, unmanufactured	76,987	$23,571	9,000	$360
Rubber manufactures, *dutiable*	.....	$2,970	.....	$5,415
Rubber substitutes, *dutiable*	.....	61	.....	.....

EXPORTS

MANUFACTURED				
Automobile and other tires	.....	$65,301	.....	$21,821
Inner tubes	.....	12,402	.....	755
Belting, hose, and packing	.....	16,925	.....	1,926
Rubber boots and shoes, *pairs*	251,211	230,903	15,938	32,212
Soles and heels	.....	13,111	.....	524
Druggists' sundries	.....	193	.....	73
Other rubber manufactures	.....	51,241	.....	37,773
Totals, manufactured	.....	$390,076	.....	$95,084
Insulated wire	.....	$13,202	.....	.....
Rubber scrap and reclaimed	73,866	5,356	.....	.....

BUFFALO

IMPORTS

UNMANUFACTURED—*free*				
Crude rubber				
From Canada	340	$133	30,624	$3,369
Totals	340	$133	30,624	$3,369
Rubber scrap and reclaimed	87,012	$3,068	39,158	1,167
Totals, unmanufactured	87,352	$3,201	69,782	$4,536
Rubber manufactures, *dutiable*	.....	$3,916	.....	$1,093

EXPORTS

MANUFACTURED				
Automobile and other tires	.....	$23,759	.....	$18,912
Inner tubes	.....	1,622	.....	1,263
Belting, hose, and packing	.....	28,374	.....	11,740
Rubber boots and shoes, *pairs*	16	30	2,024	5,686
Soles and heels	.....	281	.....	53
Druggists' sundries	.....	14,841	.....	6,031
Other rubber manufactures	.....	102,793	.....	48,033
Totals, manufactured	.....	$171,700	.....	$91,718
Insulated wire	.....	$5,063	.....	$2,358
Rubber scrap and reclaimed	246,826	43,084	10,728	1,383

FOREIGN EXPORTS

Crude rubber	238,529	$71,867	542,183	$113,696
Jelutong (Pontianak)	56,000	6,020	.....	.....

PHILADELPHIA

EXPORTS

MANUFACTURED				
Automobile and other tires	.....	$132,356	.....	$1,976
Inner tubes	.....	5,906	.....	363
Belting, hose, and packing	.....	30,882	.....	2,718
Rubber boots and shoes, *pairs*	142	252	8,432	6,156
Druggists' sundries	.....	14,867	.....	.....
Other rubber manufactures	.....	1,501	.....	117
Totals, manufactured	.....	$185,764	.....	$11,330
Insulated wire	.....	$7,102	.....	.....
Rubber scrap and reclaimed	39,040	2,342	.....	.....

NEW ORLEANS

IMPORTS

UNMANUFACTURED—*free*				
Crude rubber				
From Guatemala	2,190	$414	.....	.....
Totals, unmanufactured	2,190	$414	.....	.....
Rubber manufactures, *dutiable*	.....	$562	.....	.....

EXPORTS

	July 1920 Pounds	July 1920 Value	July 1921 Pounds	July 1921 Value
MANUFACTURED				
Automobile and other tires	.....	$178,651	.....	$3,904
Inner tubes	.....	71,001	.....	247
Belting, hose, and packing	.....	35,904	.....	2,556
Rubber boots and shoes, *pairs*	35,297	42,592	15,906	19,720
Soles and heels	.....	31,099	.....	236
Druggists' sundries	.....	394	.....	82
Other rubber manufactures	.....	14,974	.....	278
Totals, manufactured	.....	$374,615	.....	$27,023
Insulated wire	.....	$11,069	.....	$1,582

OHIO

IMPORTS

Rubber scrap and reclaimed	23,823	$1,123	.....	.....
Rubber manufactures, *dutiable*	.....	158	.....	$599

EXPORTS

MANUFACTURED				
Automobile and other tires	.....	$14,566	.....	$27,488
Inner tubes	.....	2,448	.....	2,045
Belting, hose, and packing	.....	.....	.....	58
Other rubber manufacures	.....	62	.....	46
Totals, manufactured	.....	$17,076	.....	$29,637
Insulated wire	.....	$1,660	.....	.....
Rubber scrap and reclaimed	.....	.....	40,119	$602

SAN FRANCISCO

IMPORTS

UNMANUFACTURED—*free*				
Crude rubber				
From Straits Settlements	938,825	$456,004	.....	.....
Dutch East Indies	999,867	402,026	.....	.....
British Oceania	3,476	1,696	.....	.....
Total, unmanufactured	1,942,168	$859,726	.....	.....
Rubber manufactures, *dutiable*	.....	$84	.....	$1,975

EXPORTS

MANUFACTURED				
Automobile and other tires	.....	$825,286	.....	$32,406
Inner tubes	.....	53,958	.....	2,383
Belting, hose, and packing	.....	174,734	.....	37,080
Rubber boots and shoes, *pairs*	22,528	40,337	2,301	4,527
Soles and heels	.....	2,526	.....	507
Druggists' sundries	.....	4,149	.....	674
Other rubber manufactures	.....	53,143	.....	2,108
Totals, manufactured	.....	$1,154,132	.....	$79,685
Insulated wire	.....	$2,277	.....	$1,349
Rubber scrap and reclaimed	17,720	710	20,000	400

FOREIGN EXPORTS

Rubber manufactures	.....	4	.....	.....

WASHINGTON

IMPORTS

UNMANUFACTURED—*free*				
Crude rubber				
From Japan	222,400	$80,464	.....	.....
Total, unmanufactured	222,400	$80,464	.....	.....
Rubber manufactures, *dutiable*	.....	$88	.....	$180

EXPORTS

MANUFACTURED				
Automobile and other tires	.....	$21,266	.....	$12,142
Inner tubes	.....	2,284	.....	1,047
Belting, hose, and packing	.....	13,053	.....	1,023
Rubber boots and shoes, *pairs*	199	774	133	770
Druggists' sundries	.....	309	.....	228
Other rubber manufactures	.....	4,200	.....	1,013
Totals, manufactured	.....	$41,886	.....	$16,223
Insulated wire	.....	$66	.....	$492
Rubber scrap and reclaimed	2,086	83	70,402	1,158

FOREIGN EXPORTS

Crude rubber	.....	.....	4,642	$575

CHICAGO

IMPORTS

Rubber scrap and reclaimed	26,636	$1,532	.....	.....
Rubber manufactures, *dutiable*	.....	6,339	.....	$2,250
Chicle, *dutiable*	376,586	242,608	416,108	221,006

MICHIGAN

IMPORTS

Rubber scrap and reclaimed	60,590	$2,787	33,728	$1,686
Rubber manufacture, *dutiable*	.....	740	.....	19

EXPORTS

	July 1920 Pounds	July 1920 Value	July 1921 Pounds	July 1921 Value
MANUFACTURED				
Automobile and other tires	.....	$1,665	.....	$3,485
Inner tubes	.....	.....	.....	18
Belting, hose, and packing	.....	1,788	.....	2,610
Rubber boots and shoes, *pairs*	5,456	20,080	918	3,129
Soles and heels	.....	271	.....	.....
Druggists' sundries	.....	830	.....	218
Other rubber manufactures	.....	23,363	.....	5,927
Totals, manufactured	.....	$47,997	.....	$15,387
Insulated wire	.....	$11,748	.....	$1,062
Rubber scrap and reclaimed	11,268	817	1,280	38

RUBBER STATISTICS FOR THE DOMINION OF CANADA

IMPORTS OF CRUDE AND MANUFACTURED RUBBER

	June 1920 Pounds	June 1920 Value	June 1921 Pounds	June 1921 Value
UNMANUFACTURED—*free:*				
Rubber, gutta percha, etc.:				
From United Kingdom	1,654,854	$960,073	54,596	$8,037
United States	687,148	271,475	744,054	186,887
Belgian Congo	30,421	35,228	.....	.....
Brazil	156,883	75,258	.....	.....
British East Indies—				
Ceylon	112,000	64,819	.....	.....
Straits Settlements	1,398,718	735,409	219,535	42,578
Other countries	5,462	2,185	.....	.....
Total	4,045,486	$2,144,447	1,018,185	$237,502
Rubber, recovered	435,890	80,950	50,649	7,395
Rubber, powdered, and rubber or gutta percha scrap	261,425	26,295	34,822	716
Rubber substitutes	76,243	9,181	70,859	9,311
Totals, unmanufactured	4,819,044	$2,260,873	1,174,515	$254,924
PARTLY MANUFACTURED—				
Hard rubber sheets and rods	8,134	$6,490	215	$439
Hard rubber tubes	.....	5,063	.....	3,905
Rubber thread, not covered	5,321	7,485	2,616	3,566
Totals, partly manufactured	13,455	$19,038	2,831	$7,910
MANUFACTURED—				
Belting	.....	$21,978	.....	$7,451
Hose	.....	11,281	.....	9,984
Lacking	.....	14,225	.....	3,977
Boots and shoes	.....	19,376	.....	5,726
Clothing, including waterproofed	.....	22,993	.....	11,544
Gloves	.....	1,295	.....	1,098
Hot-water bottles	.....	4,402	.....	72
Tires, solid	.....	17,694	.....	6,251
Tires, pneumatic	.....	116,913	.....	112,957
Inner tubes	.....	12,863	.....	10,199
Elastic, round or flat	.....	82,366	.....	37,639
Mats and matting	.....	275	.....	138
Cement	.....	5,929	.....	3,300
Other rubber manufactures	.....	200,559	.....	92,261
Totals, manufactured	.....	$532,149	.....	$302,597
Totals, rubber imports	4,832,499	$2,812,060	1,177,346	$565,431
Insulated wire and cables—				
Wire and cables covered with cotton, linen, silk, rubber, etc.	.....	$21,402	.....	$9,173
Copper wire and cables, covered as above	.....	23,825	.....	31,307
Chicle	23,645	14,470	41,815	21,562
Fillets	.....	.....	.....	30
Webbing	.....	16	.....	596
Fountain pens	.....	7,875	.....	1,452

EXPORTS OF DOMESTIC AND FOREIGN RUBBER GOODS

	June 1920 Produce of Canada Value	June 1920 Reexports of Foreign Goods Value	June 1921 Produce of Canada Value	June 1921 Reexports of Foreign Goods Value
UNMANUFACTURED—				
Crude and waste rubber	$12,110	.....	$3,160	$38
MANUFACTURED—				
Belting	$9,738	.....	$2,107	.....
Hose	13,674	.....	9,531	.....
Boots and shoes	91,772	$906	21,181	$13
Clothing, including waterproofed	7,315	.....	742	782
Tires, pneumatic	850,820	.....	141,871	.....
Tires	5,493	18,544	3,518	4,220
Other manufactures	73,552	1,900	7,750	1,420
Totals, manufactured	$1,052,364	$21,350	$186,700	$6,435
Totals, rubber exports	$1,064,474	$21,350	$189,860	$6,473

IMPORTS OF CRUDE RUBBER INTO THE UNITED STATES BY CUSTOMS DISTRICTS

CUSTOMS DISTRICTS	August, 1921 Pounds	August, 1921 Value
Massachusetts	562,979	$55,007
Buffalo	200	57
New York	30,541,477	4,496,912
Maryland	567,631	159,826
Los Angeles	754,839	119,270
San Francisco	606,578	95,297
Washington	22,500	3,825
Colorado	47,600	7,844
Totals	33,103,804	$4,938,038

UNITED KINGDOM RUBBER STATISTICS

IMPORTS

	July 1920 Pounds	July 1920 Value	July 1921 Pounds	July 1921 Value
UNMANUFACTURED—				
Crude rubber				
From—				
Straits Settlements	6,931,800	£703,209	4,776,200	£177,013
Federated Malay States	5,755,900	575,896	4,528,000	180,491
British India	638,100	65,460	962,900	48,039
Ceylon and dependencies	3,561,900	360,262	1,609,400	60,662
Other Dutch possessions in Indian Seas	427,000	42,340	1,402,700	55,999
Dutch East Indies (except other Dutch possessions in Indian Seas)	885,800	88,134	1,697,700	63,326
Other countries in East Indies and Pacific, not elsewhere specified	324,200	32,739	169,900	6,697
Brazil	2,395,100	227,159	452,400	15,149
Peru	6,600	576	.....	.....
South and Central America (except Brazil and Peru)	105,200	9,976	5,600	255
West Africa				
French West Africa	800	63	.....	.....
Gold Coast	42,500	4,336	2,700	108
Other parts of West Africa	28,100	1,464	14,600	393
East Africa, including Madagascar	142,800	10,237	.....	.....
Other countries	204,600	21,775	19,300	735
Totals	21,450,400	£2,143,626	15,641,400	£608,867
Waste and reclaimed rubber	710,400	12,069	77,200	1,060
Totals, unmanufactured	22,160,800	£2,155,695	15,718,600	£609,927
Gutta percha and balata	860,900	£139,604	220,600	£26,885
Rubber substitutes	158,100	7,407	11,400	441
MANUFACTURED—				
Boots and shoes, *doz. pairs*	25,574	£68,381	2,923	£7,253
Waterproof clothing	.....	512	.....	309
Insulated wire	.....	300	.....	3,975
Tires and tubes	.....	578,397	.....	354,536
Other rubber manufactures	.....	48,153	.....	54,360

EXPORTS

UNMANUFACTURED—				
Waste and reclaimed rubber	1,464,500	£41,076	365,900	£6,208
Rubber substitutes	242,800	11,556	18,200	489
Totals	1,707,300	£52,632	384,100	£6,697
MANUFACTURED—				
Boots and shoes, *doz. pairs*	37,375	£71,824	2,224	£5,485
Waterproof clothing	.....	307,090	.....	74,093
Insulated wire	.....	176,586	.....	66,499
Submarine cables	.....	44,039	.....	338,208
Tires and tubes	.....	763,504	.....	107,680
Other rubber manufactures	.....	465,741	.....	151,333

EXPORTS—COLONIAL AND FOREIGN

UNMANUFACTURED—				
Crude rubber				
To Russia	.....	.....	30,300	£1,800
Sweden, Norway and Denmark	220,900	£22,846	46,500	2,459
Germany	771,000	64,427	993,900	31,626
Belgium	378,000	48,952	241,200	7,672
France	2,680,100	266,207	1,803,600	66,260
Spain	53,600	5,728	18,300	855
Italy	402,000	42,262	367,500	12,700
Austria-Hungary	88,300	8,665	31,200	2,146
Other European countries	45,000	4,607	209,100	5,928
United States	2,454,900	276,884	3,559,000	141,929
Canada	219,700	20,587	.....	.....
Other countries	416,400	49,167	.....	.....
Totals	7,730,700	£810,332	7,300,600	£273,375
Waste and reclaimed rubber	1,900	£109	.....	.....
Gutta percha and balata	174,700	19,671	55,800	£7,181
Rubber substitutes	2,400	101	3,900	130
MANUFACTURED—				
Boots and shoes, *doz. pairs*	486	£6,599	263	£646
Waterproof clothing	.....	9	.....	.....
Insulated wire	.....	42	.....	.....
Tires and tubes	.....	107,464	.....	28,954
Other rubber manufactures	.....	2,810	.....	2,246

RUBBER STATISTICS FOR ITALY

IMPORTS OF CRUDE AND MANUFACTURED RUBBER

UNMANUFACTURED—	Three Months Ended March 1920 Quintals[1]	1920 Lire[2]	1921 Quintals	1921 Lire
Crude rubber and gutta percha raw and reclaimed:				
From French colonies in Asia..	1,475		177	
India and Ceylon.....	1,486		428	
Straits Settlements.....	1,162		8,157	
French African Colonies.	381		.....	
Great Britain.....	28		132	
Netherlands	.....	6,354,550	2,581	12,365,200
Dutch East Indies.....	.....		726	
Belgian Congo.....	245		.....	
Brazil	1,777		530	
Other countries.....	135		285	
Totals	6,689	6,354,550	13,016	12,365,200
Rubber scrap.....	111	16,650	103	15,450
Totals, unmanufactured...	6,800	6,371,200	13,119	12,380,650
MANUFACTURED—				
India rubber and gutta percha—				
Threads	98	284,200	83	240,700
Sheets, including hard rubber	23	44,800	15	25,000
Tubes	21	32,500	188	262,550
Belting	249	410,850	71	117,150
Rubber-coated fabrics in pieces	119	240,600	183	396,200
Boots and shoes....*pairs*	31,381	627,620	110	2,200
Elastic webbing	83	282,200	91	309,400
Clothing and articles for travel	57	228,000	22	88,000
Tires and tubes—				
From Belgium	355		1	
France	845		1,235	
Great Britain	1,206	7,520,800	623	5,518,800
United States.....	278		23	
Other countries.....	2		89	
Other manufactures	3,187	5,963,800	1,656	3,133,800
Totals manufactured.....	.....	15,635,370	.....	10,093,800
Total imports.....	.....	22,006,570	.....	22,474,450

EXPORTS OF CRUDE AND MANUFACTURED RUBBER

UNMANUFACTURED—				
India rubber and gutta percha— raw and reclaimed				
To Austria.....	300		.....	
France	.....		2,352	
Spain	284	65,000	253	1,327,500
United States.....	671		.....	
Other countries.....	45		50	
Totals	1,300	65,000	2,655	1,327,500
Waste	1,409	281,800	498	99,600
Totals, unmanufactured....	2,709	346,800	3,153	1,427,100
MANUFACTURED—				
India rubber and gutta percha—				
Thread	119	368,900	93	288,300
Sheets, including hard rubber	81	136,800	53	141,300
Tubes	422	542,300	587	622,000
Belting	.....	.....	7	14,700
Rubber coatedfabrics in pieces.	59	175,400	72	216,000
Boots and shoes.....*pairs*	445	8,900	100	2,000
Other footwear.....	1	1,500	2	3,000
Elastic webbing.....	359	1,364,200	193	733,400
Clothing and articles for travel	94	470,000	18	90,000
Tires and tubes:				
To Austria	333		457	
Belgium	225		727	
Czecho-Slovakia	373		44	
Denmark	483		.....	
France	337		322	
Great Britain.....	3,006		3,342	
Netherlands	222		122	
Rumania	269		560	
Spain	104		107	
Switzerland	131	25,047,500	140	20,520,000
Hungary	216		.....	
India and Ceylon.....	1,056		404	
Dutch East Indies.....	673		718	
Straits Settlements.....	391		7	
Australia	231		.....	
Argentina	654		490	
Brazil	687		124	
Other countries.....	628		744	
Other rubber goods.....	2,377	4,432,200	3,883	7,156,600
Totals, manufactured.....	.....	32,547,700	.....	29,787,300
Total, exports	.....	32,894,500	.....	31,214,400

[1] Quintal equals 220.46 pounds.
[2] One lira equals $0.193 (normal).

THE MARKET FOR RUBBER SCRAP

NEW YORK

THE rubber scrap market continues to be stagnant. There is no correct proportion of prices to grades in such sales as are effected, dealers frequently disregarding profits for the sake of liquidating their holdings. Practically all reclaimers are out of the market although there are small dealings in boots and shoes at 2¾ to 3 cents a pound delivered at reclaiming plants for sizable lots.

QUOTATIONS FOR CARLOAD LOTS DELIVERED

September 26, 1921

Prices subject to change without notice

BOOTS AND SHOES			
Boots and shoes	*lb.*	$0.03¼ @	.03½
Trimmed arctics	*lb.*	.02½ @	
Untrimmed arctics	*lb.*	*.02 @	
HARD RUBBER			
Battery jars, black compound	*lb.*	*.07½ @	
No. 1, bright fracture	*lb.*	*.12 @	.15
INNER TUBES			
No. 1	*lb.*	.04¼ @	
Compounded	*lb.*	.03¾ @	
Red	*lb.*	.03½ @	
MECHANICALS			
Black scrap, mixed, No. 1	*lb.*	*.02¼ @	.03
No. 2	*lb.*	*.01½ @	.02
Heels	*lb.*	*.02½ @	.03
Horse-shoe pads	*lb.*	*.02½ @	.03
Hose, air brake	*lb.*	*.01 @	.01½
fire, cotton lined	*lb.*	*.01 @	
garden	*lb.*	.07 @	
Matting	*lb.*	*.01 @	
Red packing	*lb.*	*.04½ @	.05
Red scrap, No. 1	*lb.*	*.07 @	.08
No. 2	*lb.*	*.05½ @	.06
White scrap, No. 1	*lb.*	*.07 @	.07½
No. 2	*lb.*	*.06 @	.06½
TIRES			
PNEUMATIC—			
Auto peelings	*lb.*	.01½ @	
Bicycle	*lb.*	*.01½ @	.02
Standard white auto	*lb*	*.02¼ @	.02¾
Mixed auto	*lb.*	.01 @	
Stripped, unguaranteed	*lb*	*.01 @	.01½
White, G. & G., M. & W., and U. S.	*lb.*	*.02¾ @	
SOLID—			
Carriage	*lb.*	*.02¼ @	.02¾
Iron	*lb.*	@	
Truck, clean	*lb.*	*.01½ @	.02

*Nominal.

THE MARKET FOR COTTON AND OTHER FABRICS

NEW YORK

THE Department of Agriculture announced August 25 its forecast of a total production of 7,037,000, equivalent 500 pound bales, based on a canvass made that date, and declared everything seemed to have gone wrong with the crop. The 49.3 per cent average condition as given by the Government for the cotton crop is the lowest in the history of cotton crop reports.

The damage is due both to unfavorable weather conditions and ravages of the boll weevil. Spot middling upland grade on August 26 advanced 85 points to 15 cents, continuing to rise till 21.10 cents was quoted September 12, declining to 20.15 cents on September 24.

EGYPTIAN COTTON. Egyptian cotton is exceedingly strong partly in sympathy with the American cotton market, but also owing to unfavorable crop conditions in Egypt. It is reported that a serious pink worm destruction and adverse weather has injured the growing crop.

Medium grades of Sakellarides are quoted from 35 to 38 cents ex duty, and uppers 30 to 32 cents.

SEA ISLAND COTTON. Sea Island grades have been practically neglected.

ARIZONA COTTON. Arizona cotton has been hard to buy as holders believe they will be able to obtain not less than 50 cents

later in the season. No. 2 grade is quoted at 40 cents, but probably could not be bought in quantity at that price.

Mechanical Ducks and Drills. The demand is gradually increasing and prices are following the rise in raw cotton.

Sheetings. The mills are asking very high prices owing to the steady advance in raw cotton. They do not care to contract and prefer to sell stock goods only. Price are likely to rule high for some time.

Tire Fabrics. The advance in cotton has stimulated some interest in fabric. Sales have been few and the total not of sufficient volume to improve the mill situation very much. The large tire companies are still drawing on their old contracts which have some time to run, but have reduced their specifications for the fall months. It is hoped that by spring all the high-priced cottons will have been worked up so that the market will be free of costly goods and legitimate tire manufacturers placed in a position to properly compete with the new comers.

The rate at which fabric is now being produced by the mills indicates an over production between 150 and 200 per cent which will necessitate diversion from tire fabric products to other textiles.

During the last week of the month just passed, the market for tire fabrics developed considerable strength and prices advanced 5 cents a pound on all grades. The strong position of the long-staple cotton market, due to the reported shortage of this crop, is the attributed cause.

NEW YORK QUOTATIONS

September 26, 1921

Prices subject to change without notice

BURLAPS			
40—7-ounce		$4.30	@
40—7½-ounce	100 yards	4.50	@
36—8-ounce		4.35	@
40—8-ounce		4.60	@
40—10-ounce		6.25	@
40—10½-ounce		6.35	@
45—7½-ounce			@
45—8-ounce			@
45—10-ounce			@
DRILLS			
38-inch 2.00-yard	yard	.21	@
40-inch 3.47-yard		.12¼	@
52-inch 1.90-yard		.24½	@
52-inch 1.95-yard		.23⅝	@
60-inch 1.52-yard		.29⅜	@
DUCK			
CARRIAGE CLOTH			
38-inch 2.00-yard enameling duck	yard	.20½	@
30-inch 1.74-yard		.23	@
72-inch 16.66-ounce		.47	@
72-inch 17.21-ounce		.48⅜	@
MECHANICAL			
Hose	pound	.38	@
Belting		.38	@
HOLLANDS, 40-INCH			
DEAD FINISH			
Piece		.20	@
Cut		.25	@
FLAT FINISH			
Piece		.16½	@
Cut		.18½	@
LONSDALE			
White, piece		.40	@
cut		.50	@
Colors, piece		.42½	@
cut		.53	@
Green and blue, piece		.46½	@
cut		.58	@
NAINSOOKS			
White		.18 @	.21⅝
Flesh		.22 @	
RAINCOAT FABRICS			
COTTON			
Bombazine 64 x 60	yard		@
60 x 48			@
Cashmeres, cotton and wool, 36-inch, tan		.60	@
Twills 64 x 72		.10 @	.12
60 x 102		.14	@
Twill, mercerized, 36-inch, blue and black		.26	@
tan and olive		.24½	@
Tweed		.20 @	1.00
printed		.15	@
Plaids 60 x 48			@
56 x 44			@
Repp			@
Prints 60 x 48			@
64 x 60			@
IMPORTED WOOLEN FABRICS SPECIALLY PREPARED FOR RUBBERIZING—PLAIN AND FANCIES			
63-inch, 3¼ to 7½ ounces	yard		@
36-inch, 2¾ to 5 ounces			@
IMPORTED PLAID LINING (UNION AND COTTON)			
63-inch, 3½ to 7 ounces	yard		@
36-inch, 2 to 4 ounces			@
SHEETINGS, 40-INCH			
48 x 48, 2.50-yard		.14½	@
48 x 48, 2.85-yard		.12¾	@
64 x 68, 3.15-yard		.13¾	@
56 x 60, 3.60-yard		.12	@
48 x 44, 3.75-yard		.10½	@
SILKS			
Canton, 38-inch	yard	.29½	@
Schappe, 36-inch		.45	@
STOCKINETTES			
SINGLE THREAD			
3½ Peeler, carded	pound		@
4½ Peeler, carded			@
6½ Peeler, combed			@

DOUBLE THREAD			
Zero Peeler, carded	pound		@
3½ Peeler, carded			@
6½ Peeler, combed			@
TIRE FABRICS			
BUILDING			
17¼-ounce Sakellarides, combed	pound	$0.90	@$0.95
17¼-ounce Egyptian, combed		.80	@ .90
17¼-ounce Egyptian, carded		.75	@ .80
17¼-ounce Peelers, combed		.80	@ .90
17¼-ounce Peelers, carded		.55	@ .65
CORD			
15-ounce Egyptian	pound	.85	@ .90
BICYCLE			
8-ounce American	pound		@
10-ounce American			@
CHAFER			
9¼-ounce Sea Island	pound		@
9¼-ounce Egyptian, carded		.90	@ .95
9¼-ounce Peeler, carded		.80	@

THE MARKET FOR CHEMICALS AND COMPOUNDING INGREDIENTS

NEW YORK

The course of the market during the past month has proceeded with unchanged prices as a rule. In the case of lithopone, prices for the last quarter of the year were reduced one cent a pound for domestic. Persistent efforts are being made to reestablish the trade in German lithopone which is offered at 5 to 6 cents a pound. It is, however, of very unsatisfactory quality and said to be a by-product. Some consumers are importing lithopone of Belgian origin at prices and qualities equal to domestic.

Aniline Oil. Stocks are abundant and business dull at prices ranging from 18 to 20 cents a pound.

Barytes. The call is routine at $23.00 a ton. German barytes of somewhat inferior quality is being imported.

Benzol. The supply continues limited due to stoppage of the coke industry. The demand is brisk for both export and domestic use, and difficult to fill satisfactorily.

Cadmium Sulphide. Prices range from $1.25 to $1.50 a pound.

Carbon Bisulphide. An improved and well-sustained demand has developed from the rubber trade.

Carbon Tetrachloride. Consumers' business has been moderate and supplies abundant.

China Clay. The market for both imported and domestic grades has been fairly active at steady prices.

Dry Colors. Market conditions have continued rather quiet, with prices at producers' low levels.

Gas Black. Business from the rubber trade has been brisk at times during the month with steady call from other consumers and totaling a good demand.

Lampblack. It is reported that the Treasury Department may list lampblack under dye embargo as a controllable commodity under the dye and chemical section of the Customs Division of the Department. Domestic producers have called attention to the fact that while their product is not a coal-tar derivative, it is almost entirely produced by burning anthracene and creosote, which are recognized coal-tar products.

Litharge. The demand continues subnormal, although a slight improvement is in progress.

Lithopone. A price cut of one cent a pound was made by the leading producers nearly a month ago to meet foreign competition. This, it is hoped, will induce consumers to place quarterly contracts very soon. The demand is fair, but not sufficient to warrant full capacity production.

Solvent Naphtha. The routine market of the past month is showing some improvement.

Sublimed Lead. There has been a fair demand by consumers at 6¾ to 7½ cents a pound.

Sulphur. Prices for commercial flour have ruled steady at from $1.45 to $2.10 a hundred.

Sulphur Chloride. Stocks are excessive and prices are low.

Talc. There has been a steady market for both foreign and domestic grades.

Whiting. There has been the average seasonal demand. The market is amply stocked.

Zinc Oxide. Tire manufacturers have been good buyers of zinc oxide the past month. The demand of users generally has improved and the outlook is reported to be promising.

NEW YORK QUOTATIONS

September 26, 1921

Prices subject to change without notice

ACCELERATORS, ORGANIC			
Accelerene (f. o. b. English port)	lb.	13s.	@
Accelemal (bbl.)	lb.	$0.50	@
Acco	lb.	.75	@
Aldehyde ammonia crystals	lb.	.95	@ 1.00
Aniline oil (f. o. b. factory)	lb.	.18	@ .26
Excellerex	lb.	.55	@ .65
Formaldehyde aniline	lb.		@
Hexamethylene tetramine	lb.	.75	@ .80
Lead oleate (400 lb. bbls. factory)	lb.	.16	@
N. C. C.	lb.		@
No. 999	lb.	.13¼	@
Paradin	lb.		@
Paraphenylene diamine	lb.		@
Thiocarbanilide	lb.	.55	@ .60
Vulcocene	lb.		@
X L O	lb.		@
ACCELERATORS, INORGANIC			
Lead, dry red	lb.	.10	@
sublimed blue	lb.		@
sublimed white	lb.		@
white, basic carbonate	lb.	.06½	@
Lime, flour	lb.	.02½	@
Litharge, domestic	lb.	.08½	@
imported	lb.	.17	@
sublimed	lb.		@
Magnesium, carbonate, light	lb.	.07	@ .10
calcined light	lb.	.27	@ .30
extra light	lb.	.50	@
medium light	lb.	.25	@
calcined heavy (bbl.)	lb.	.06	@ .07
ACIDS			
Acetic 28 per cent	lb.	.02½	@ .03
glacial, 99 per cent	lb.	.10	@ .10¾
Cresylic (97% straw color, drums)	gal.	.80	@
(95% dark, drums)	gal.	.75	@
Muriatic, 20 degrees	lb.	.01½	@ .02
Nitric, 36 degrees	lb.	.05½	@ .06½
Sulphuric, 66 degrees	ton	18.00	@20.00
ALKALIES			
Caustic soda	lb.	.03¾	@ .04½
Soda ash, 58%	cwt.	2.10	@ 2.15
COLORS			
Black			
Bone, powdered	lb	.06½	@ .08½
Carbon black (sacks, factory)	lb.	.10½	@ .20
pressed	lb.		@
Dipped goods	lb.	1.00	@
Drop	lb.	.07½	@ .16
Ivory black	lb.	.15	@ .45
Lampblack	lb.	.17	@ .45
Micronex	lb.	.12	@ .15
Oil soluble aniline	lb	.95	@
Rubber black	lb.	.10	@ .16
Rubber makers' non-flying black	lb.		@
Blue			
Cobalt	lb.	.27	@ .35
Dipped goods	lb.	1.00	@
Prussian	lb.	.50	@
Rubber makers' blue	lb.		@
Ultramarine	lb.	.16	@ .35
Brown			
Iron oxide	lb.	.04	@ .05
Sienna, Italian, raw and burnt	lb.	.06	@ .07
Sienna, Italian, raw (tan color)	lb.		@
Umber, Turkey, raw and burnt	lb.	.05½	@ .07
Vandyke	lb.	.04	@ .05

COLORS—Continued

Green			
Chrome, light	lb.	$0.32	@$0.34
medium	lb.	.34 @	.39
dark	lb.	.43 @	.47
commercial	lb.	.12 @	
tile	lb.	.15 @	
Guignet	lb.	1.50 @	
Dipped goods	lb.	1.00 @	
Oxide of chromium	lb.	@	
Rubber makers' green	lb.	@	
Red			
Antimony, crimson	lb.	.40 @	
crimson, E. 15/17% (bbls.)	lb.	@	
crimson, F	lb.	.35 @	
crimson, R. M. P.	lb.	.48 @	
Antimony, golden	lb.	.25 @	
golden, R. M. F.	lb.	.18 @	
golden 1	lb.	.30 @	
golden 2	lb.	.25 @	
golden, E. 15/17% (bbls.)	lb.	@	
7-A	lb.	.35 @	
vermilion	lb.	.55 @	
red sulphuret	lb.	.25 @	
Arsenic, red sulphide	lb.	.12½ @	
Dipped goods, red	lb.	1.00 @	
purple	lb.	1.00 @	
orange	lb.	1.00 @	
Indian	lb.	.08 @	.14
Iron oxide, reduced grades	lb.	.03 @	.13
pure bright	lb.	.14 @	
Maroon oxide	lb.	.12 @	
Oil soluble aniline, red	lb.	1.75 @	2.00
orange	lb.	1.50 @	
Oximony	lb.	.16 @	
Para toner	lb.	1.40 @	
Red excelsior	lb.	@	
Rubber-makers' red (four shades)	lb.	@	
purple	lb.	@	
Spanish natural	lb.	.04½ @	.05
Toluidine toner	lb.	2.50 @	2.75
Venetian	lb.	.02¼ @	.05
Vermilion, American	lb.	.25 @	.30
permanent	lb.	@	
English quicksilver	lb.	.95 @	1.00
White			
Albalith	lb.	.06 @	.06½
Aluminum bronze	lb.	.60 @	.65
Lithopone, Beckton white	lb.	.06 @	.06½
Lithopone, domestic (factory)	lb.	.06 @	.06½
Ponolith (carloads, factory)	lb.	@	
Rubber-makers' white	lb.	@	

		C.L.		L.C.L.
Zinc oxide. American Horse Head (factory)	lb.	.08¾	@	.09¾
Special	lb.	.08	@	.08½
XX red	lb.	.07½	@	.08
French process, Florence brand factory:				
White seal	lb.	.11	@	.11¾
Green seal	lb.	.09¾	@	.10¼
Red seal	lb.	.08¾	@	.09¼
White seal	lb.	.11	@	11¼
Azo (factory):				
ZZZ (lead free)	lb.	.07½	@	.08
ZZ (under 5% leaded)	lb.	.07¼	@	.07¾
Z (8-10% leaded)	lb.	.07	@	.07¼

Yellow			
Arsenic, yellow sulphide	lb.	@	
Cadmium, sulphide	lb.	1.25 @	1.50
Chrome, light and medium	lb.	.20 @	
C. P.	lb.	.20 @	
Dipped goods	lb.	1.00 @	
Ochre, domestic	lb.	.02¾ @	.03¼
imported	lb.	.02½ @	.03½
Oil soluble aniline	lb.	1.60 @	
Rubber makers' yellow	lb.	3.50 @	
Zinc yellow	lb.	.37 @	

COMPOUNDING INGREDIENTS

Aluminum flake (carloads)	ton	29.45 @	
hydrate, light	lb.	.22 @	.25
Ammonium carbonate (lump)	lb.	.06 @	.09
Asbestine	ton	20.00 @	
Barium, carbonate	ton	50.00 @	60.00
dust	ton	100.00 @	
Barytes, pure white (carloads)	ton	23.90 @	
off color (carloads)	ton	20.00 @	
uniform floated (carloads)	ton	23.90 @	
Basofor	lb.	$0.04 @	
Beta-naphthol	lb.	.33 @	
Blanc fixe	lb.	.03½ @	
Bone ash	lb.	@	
Carrara filler (factory)	ton	18.00 @	
Chalk, precipitated, extra light (f. o. b. factory)	lb.	.03½ @	.04¼
heavy (f. o. b. factory)	lb.	.02½ @	.03¼
China, clay, Dixie	ton	22.00 @	35.00
Blue Ridge	ton	22.00 @	32.00
domestic	ton	@	
imported, lump	ton	16.00 @	24.00
Cotton linters, clean mill run	lb.	.03½ @	
Diatomite	lb.	.02½ @	
Fossil flour (powdered)	ton	60.00 @	
(bolted)	ton	65.00 @	
Glue, high grade	lb.	.30 @	.40
medium	lb.	.15 @	.30
low grade	lb.	.09 @	.15
Graphite, flake	lb.	.10 @	
amorphous	lb.	.05 @	
Ground glass FF. (bbls.)	lb.	@	
Infusorial earth (powdered)	ton	60.00 @	
(bolted)	ton	65.00 @	
Liquid rubber	lb.	.15 @	
Mica, powdered	lb.	@	
Phenanthrene	lb.	@	
Pumice stone, powdered (bbl.)	lb.	.03 @	.08
Rotten stone, powdered	lb.	.02½ @	.04½
Rubber paste	lb.	@	
Silica, aluminum	ton	23.00 @	25.00
gold bond	ton	35.00 @	
silver bond	ton	25.00 @	
Soap bark, powdered	lb.	.23 @	
Soapstone, powdered-gray (carloads)	ton	12.00 @	
Starch, powdered corn (bags)	cwt.	2.08 @	
(bbls.)	cwt.	2.36 @	
Talc, powdered soapstone	ton	15.00 @	20.00
Terra blanche	ton	.22 @	.25
Tripoli flour, air-floated, cream or rose (factory)	ton	@	
white (factory)	ton	@	
Tyre-lith	ton	@	
Whiting, Alba	cwt.	15.00 @	18.00
Columbia	cwt.	.60 @	.75
commercial	cwt.	1.05 @	1.10
Danish	ton	20.00 @	
English cliffstone	cwt.	1.60 @	2.00
gilders	cwt.	1.20 @	1.35
Paris, white, American	cwt.	1.30 @	1.40
Quaker	ton	13.00 @	15.00
Superfine	ton	@	
Wood pulp, imported	ton	@	
XXX (f. o. b. factory)	ton	36.00 @	
X (f. o. b. factory)	ton	34.00 @	
Wood flour	ton	35.00 @	40.00

MINERAL RUBBER

Elateron (c. l. factory)	ton	@	
(l. c. l. factory)	ton	@	
Gilsonite	ton	70.00 @	
Genasco (c. l. factory)	ton	50.00 @	
(l. c. l. factory)	ton	52.00 @	
Hard hydrocarbon	ton	33.00 @	45.00
Soft hydrocarbon	ton	30.00 @	40.00
320 M. P. hydrocarbon (c. l. factory)	ton	50.00 @	55.00
(l. c. l. factory)	ton	57.50 @	
300/310 M. P. hydrocarbon (c. l. factory)	ton	40.00 @	
(l. c. l. factory)	ton	45.00 @	
Pioneer, M. R. (c. l. factory)	ton	34.00 @	65.00
Raven M. R.	ton	@	
Robertson, M. R. pulverized (c. l. factory)	ton	@	
M. R. pulverized (l. c. l. factory)	ton	@	
M. R. (c. l. factory)	ton	50.00 @	
M. R. (l. c. l. factory)	ton	52.50 @	
Rubrax (c. l. factory)	ton	50.00 @	
States "A"	ton	45.00 @	
No. 1	ton	40.00 @	
Synpro, granulated, M. R. (factory)	ton	64.50 @	

OILS

Avoilas compound (bbl.)	lb.	.14 @	
Castor, No. 1, U. S. P.	lb.	.11 @	
No. 3, U. S. P.	lb.	.09½ @	
Corn (bbls. factory)	lb.	.09½ @	
refined	gal.	1.11 @	
Cotton (bbls. factory)	lb.	.10¼ @	
Glycerine (98 per cent)	lb.	.14½ @	.15
Halowax	gal.	.25 @	.27
Linseed, raw, domestic	gal.	.77 @	
imported	gal.	.68 @	
Linseed compound	gal.	@	
Palmoline	lb.	@	
Palm, niger (casks, factory)	lb.	.07½ @	
Peanut (bbls. factory)	lb.	.09¼ @	
Petrolatum, standard	lb.	.08 @	
Petrolatum, sticky	lb.	.10 @	.12
Pine, steam distilled	gal.	1.00 @	1.35
Rapeseed, refined (factory)	gal.	.85 @	
blown	gal.	.90 @	
Rosin	gal.	.40 @	.44
Synpro	gal.	.35 @	.60
Soya bean	lb.	.08¼ @	
Tar	gal	.30 @	.35

RESINS AND PITCHES			
Cantella gum	lb.	$0.50	@
Cumar resin, hard	lb.	.09	@ .13
soft	lb.	.09	@ .13
Tar, retort	bbl.	11.00	@12.50
kiln	bbl.	10.00	@11.50
pine retort	bbl.		@
Pitch, Burgundy	lb.	.05	@
coal tar	lb.	.01½	@
pine tar	lb.	.03½	@
ponto	lb.	.08	@
Rosin, K (bbl.)	280 lbs.	6.25	@
strained (bbls.)	280 lbs.	5.80	@
Shellac, fine orange	lb.	.90	@
SOLVENTS			
Acetone (98.99 per cent drums [6.62 lbs. per gal.])	lb.	.12½	@ .13½
Benzol (90%, drums [7.21 lbs. per gal.])	gal.	.25	@ .31
pure (drums)	gal.	.27	@ .35
Carbon bisulphide (drums [10.81 lbs. per gal.])	lb.	.06¼	@ .07½
tetrachloride (drums [13.28 lbs. per gal.])	lb.	.11½	@ .13
Paracymene (factory)	gal.	1.00	@
Motor gasoline (steel bbls.)	gal.	.24	@
73@76 degrees (steel bbls.)	gal.		@
68@70 degrees (steel bbls.)	gal.		@
Naphtha, V. M. & P. (steel bbls.)	gal.	.23	@
solvent (drums extra)	gal.	.28	@
Toluol, pure (7.21 lbs. per gal.)	gal.	.28	@ .34
Turpentine, spirits	gal.	.78	@
wood	gal.	.75	@
Xylol, pure (7.21 lbs. per gal.)	gal.	.40	@ .43
commercial	gal.	.28	@ .35
SUBSTITUTES			
Black	lb.	$0.08	@$0.14
White	lb.	.09	@ .16
Brown	lb.	.11	@ .15
Brown factice	lb.	.07	@ .14
Rubber factice	lb.		@
White factice	lb.	.08½	@ .15½
Paragol, soft and medium	cwt.	6.81	@
hard	cwt.	6.81	@
VULCANIZING INGREDIENTS			
Lead, black hyposulphite (black hypo)	lb.	.40	@
Orange mineral, domestic	lb.	.11	@ .13
Sulphur chloride (jugs)	lb.	.20	@
(drums)	lb.	.08	@
Sulphur, flour, Brooklyn brand (carloads)	cwt.		@
Brooklyn brand (less carload)	cwt.		@
Bergenport brand (bbls.)	cwt.	2.55	@
(bags)	cwt.	2.30	@
light 100% pure (bbls.)	cwt.	2.60	@ 3.15
(bags)	cwt.	2.35	@ 2.90
superfine 99½% pure (carloads, bbls.)	cwt.	2.40	@ 2.90
(bags)	cwt.	2.00	@ 2.50
(See also Colors—Antimony).			
WAXES			
Wax, beeswax, white, commercial	lb.	.55	@
ceresine, white	lb.	.12	@
carnauba	lb.	.16	@
Montan	lb.	.07	@
ozokerite, black	lb.	.25	@
green	lb.	.25	@
paraffine	lb.	.03½	@ .08
sweet wax	lb.	.12	@

OCEAN RATES FROM NEW YORK ON TIRES, TUBES, MECHANICAL GOODS, CLOTHING, FOOTWEAR AND DRUGGISTS' SUNDRIES[1]

(Same rates apply from other Atlantic ports where service is available.)

Country and Port	Rates Cu. Ft.	Rates 100 lbs.
AFRICA		
AFRICA, EAST COAST—		
Beira	..	*$26.00
Plus landing charges $0.30 per ton.		
Kilendini	..	*30.40
Delagoa Bay, Lourenco Marques	..	*25.40
Mauritius	..	*31.00
NORTH COAST—		
All ports	..	*22.00
EGYPT—		
Alexandria	..	*22.00
SOUTH COAST—		
Algoa Bay	..	*23.60
Capetown	..	*23.00
East London	..	*24.20
Port Natal	..	*24.80
WEST COAST—		
Accra-Lagos, Secondi, Buruttu, Dakar, Freetown	..	*30.00
Boma, Matadi	..	*28.00
	..	*32.00
ASIA		
CHINA—		
Hongkong, Shanghai	..	*23.00
INDIA—		
All direct ports	..	*21.00
Madras, Rangoon	..	*23.00
JAPAN—		
All direct ports	..	*23.00
JAVA—		
All ports	..	*21.00
MANCHURIA—		
Dalny	..	*24.00
PHILIPPINES—		
Manila	..	*23.00
STRAITS SETTLEMENTS—		
Singapore, Penang	..	*21.00
SYRIA—		
Beyrout	..	*24.00
CENTRAL AMERICA		
COSTA RICA—		
Port Limón	$.64	1.31
MEXICO—		
Tampico	.52½	1.05
Plus 2½c. per 100 lbs. bar dues.		
Vera Cruz, Puerto Mexico	.52½	1.05
PANAMA—		
Colon	.32	.64
Plus $1 per ton transfer charge.		
Panama	.37	.74
Plus $1 per ton transfer charge.		
SALVADOR—		
La Libertad	.79	1.42
EUROPE		
BELGIUM—		
Antwerp	.40	.75
BRITISH ISLES—		
All ports	.45	.85
Except rubber belting	.50	1.00
CANARY ISLANDS—		
Las Palmas	..	*25.00
DENMARK—		
Copenhagen	.55	1.00
ESTHONIA—		
Reval	.75	1.50
FINLAND—		
Helsingfors	.75	1.50
FRANCE—		
All Atlantic ports	.40	.75
Marseilles	..	*20.00
GERMANY—		
Hamburg, Bremen	.45	.82½
Danzig	.50	.90
GREECE—		
All ports	..	*22.00
HOLLAND—		
Rotterdam	.40	.75
Amsterdam	.40	.75
ITALY—		
Direct ports	.50	1.00
Fiume, Trieste, Venice	..	*26.00
NORWAY—		
All ports	.55	1.00
PORTUGAL—		
Lisbon	..	*20.00
Oporto	..	*25.00
RUMANIA—		
All ports	..	*25.00
SPAIN—		
All ports	..	*20.00
Gibraltar	.65	1.20
SWEDEN—		
Malmö, Stockholm	.65	1.25
Gothenburg	.55	1.00
SOUTH AMERICA		
ARGENTINA—		
Buenos Aires	..	*20.00
Rosario	..	*27.50
BRAZIL—		
Rio de Janeiro	..	*22.50
Santos	..	*20.00
Bahia	..	*24.00
Pernambuco	..	*23.50
CHILE—		
All ports	.74	1.32
COLOMBIA—		
Cartagena, Puerto Colombia, Santa Marta	.51	1.12
Plus government charges.		
Buenaventura—		
(via direct steamer)	1.03	1.84
(via transshipment)	.98	1.75
ECUADOR—		
Guayaquil—		
(via direct steamer)	.74	1.32
(via transshipment)	.70	1.25
PERU—		
Callao, Mollendo	.74	1.32
URUGUAY—		
Montevideo	..	*20.00
VENEZUELA—		
La Guayra	.40	.65
Plus 4c per 100 kilos landing charge, plus 40% surcharge.		
OCEANIA		
AUSTRALIA—		
All ports	..	*25.00
NEW ZEALAND—		
All ports	..	*25.00
WEST INDIES		
BERMUDA—		
Hamilton	.37	.75
Grenada, St. Croix, St. Thomas, St. Kitts	.50	1.00
Port of Spain	.40	.75
CUBA—		
Havana	.47	.94
Plus 30c per 100 lbs. Cuban wharfage and handling charges.		
Santiago	.59	1.18
Cienfuegos	.61	1.21
CURAÇAO—		
Curaçao	.30	.65
Plus 40% surcharge.		
JAMAICA—		
Kingston	.42	.84
PORTO RICO—		
All ports	.31	.75
San Juan landing charge 1c per ft., or 2½c per 100 lbs. additional.		
SANTO DOMINGO—		
Santo Domingo	.51	.91

[1]Compiled by Austin Baldwin & Co., Inc., foreign freight contractors, 44 Whitehall st., New York, N. Y.

*Rate figured on ton of 40 cubic feet or 2,240 lbs.

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TABLE OF CONTENTS

B